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A REVISION OF *HESPERANTHA* (IRIDACEAE) IN THE WINTER RAINFALL AREA OF SOUTHERN AFRICA[1]

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ABSTRACT

Hesperantha, a genus of Iridaceae–Ixioideae, comprises some 55 species occurring in Africa south of the Sahara. Its centre is in the winter rainfall area of southern Africa, where 36 species are recognised. A further approximately 20 species occur north eastward from the Transkei to Ethiopia, with a marked secondary centre in the Drakensberg of Natal–Lesotho. In the winter rainfall area, species are concentrated in the western Cape Floristic Region and adjacent western Karoo, with decreasing representation north into Namaqualand and east through the southern Cape to the Grahamstown district where species of the winter and summer rainfall areas meet. The genus is closely related to *Geissorhiza*, a predominantly Cape genus of some 70 species. *Hesperantha* is defined by its characteristic style, which typically divides at the apex of the perianth tube (rarely within the tube) into three long spreading branches, often longer than the style itself. It is basically moth-pollinated, most species having small, pale-coloured flowers that open in late afternoon and çlose some time during the night, but several species are brightly coloured and are day blooming. The genus exhibits a wide range of variation in corm types in the winter rainfall area and these organs are important in the infrageneric classification adopted here. Variation in floral characters is relatively limited. Of the species recognised here, 16 only were included (two as *Geissorhiza*, one as *Tritonia* and one as *Syringodea*) in *Flora Capensis* (1896), the only comprehensive treatment of southern African Iridaceae. Three more admitted in *Flora Capensis* have been reduced to synonymy and one to subspecies rank.

Fourteen species are described here for the first time. Basic chromosome number is $x = 13$, and only diploids have been recorded in the winter rainfall area, where some 25 species have been counted.

UITTREKSEL

'N HERSIENING VAN *HESPERANTHA* (IRIDACEAE) VAN DIE WINTER-REËNVALSTREEK VAN SUIDELIKE AFRIKA

Hesperantha, 'n genus van die Iridaceae–Ixioideae, bestaan uit sowat 55 soorte wat in Afrika suid van die Sahara voorkom. Die sentrum van verspreiding is die Winterreënvalstreek van suidelike Afrika waar 35 soorte erken word. 'n Verdere 20 soorte kom noord-ooswaarts vanaf die Transkei tot in Ethiopië voor met 'n opmerklike konsentrasie in die Natal–Lesotho Drakensberge. In die Winterreënvalstreek is die soorte gekonsentreerd in die westelike gedeelte van die Kaapse Floristiese Streek

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en die aangrensende westelike Karoo, met 'n dalende teenwoordigheid noordwaarts in Namakwaland en ooswaarts deur die Suid-Kaap tot die Grahamstad-distrik waar die soorte van die Winter- en Somerreënvalstreke ook aangetref word. Die genus is naverwant aan *Geissorhiza*, 'n oorwegend Kaapse genus van sowat 70 soorte. *Hesperantha* word onderskei deur 'n kenmerkende styl wat tipies verdeel by die bo-punt van die blomdekbuis (met uitsondering binne in die buis), in drie wydverspreide takke, meestal langer as die styl self. Dit word normaalweg deur motte bestuif en meeste soorte het klein, bleek blommetjies wat in die laat namiddag oopgaan en een of ander tyd in die nag toegaan. Sommige soorte is helderkleurig en gaan gedurende die dag oop. Die groot variasie in knoltipes en organe wat in die genus aangetref word, is belangrik vir die infra-generiese klassifikasie soos hier voorgestel. Variasie in blomkenmerke is relatief beperk. Van die soorte hier erken word net 16 (twee *Geissorhiza*, een *Tritonia* en een *Syringodea*) in *Flora Capensis* (1896), die enigste omvattende verhandeling van suider-Afrikaanse Iridaceae, beskryf. Drie *Flora Capensis*-soorte is verlaag tot sinonieme en een tot 'n subspesie.

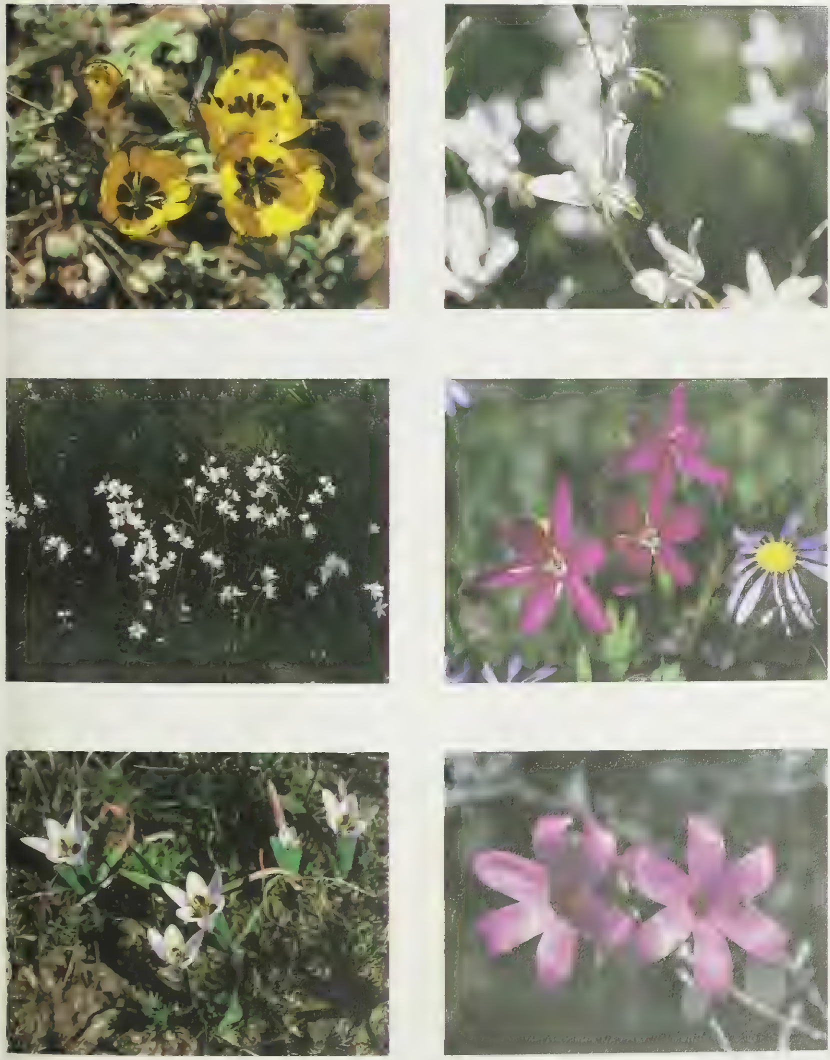
Veertien soorte word vir die eerste keer hier beskryf. Die basiese chromosoomgetal is $x = 13$ en almal van die sowat 25 Winterreënvalstreeksoorte waarvan die chromosome getel is, was diploïed.

Key words: *Hesperantha*, sp. nov., sect. *Concentrica*, sect. *Hesperantha*, sect. *Radiata*, sect. *Imbricata*, Iridaceae, south western Cape, Namaqualand, Karoo, chromosome cytology, phylogeny.

INTRODUCTION

Hesperantha is a genus of some 55 species, occurring in Africa, south of the Sahara. Distribution is restricted to temperate, montane habitats in tropical Africa, and the concentration of species increases in southern Africa where the primary centre is the winter rainfall area of the south and west coast and a secondary centre is located in the Drakensberg of Natal, Lesotho and Transkei, a summer rainfall area. The genus has been treated only once for all of southern Africa, in *Flora Capensis* (Baker, 1896) in which 26 species were recognised, 16 in the winter rainfall area, while four more were placed in *Geissorhiza, Tritonia* or *Syringodea*. Several more were added subsequently, most recently by Foster (1948) who described ten new species and made substantial changes to the nomenclature in a preliminary systematic study (eight are treated here as synonyms of earlier species). In his study Foster provided no keys, and did not deal at all with several well-known species.

The present revision, which treats only the species of the winter rainfall regions of the Cape, Namaqualand and the adjacent parts of the western and southern Karoo, includes the majority of the species in the genus, and also most of the infrageneric variation in *Hesperantha*. The winter rainfall region of the Cape Province is clearly the major centre for the genus and an area where considerable recent speciation has occurred. I hope in a future paper to revise the genus in tropical and eastern southern Africa, following studies by Hilliard & Burtt (1979; 1982; in prep.) of *Hesperantha* in the Drakensberg area of Natal and Lesotho. In the formal taxonomic treatment, 36



Figs 1–6.
From left to right and top to bottom. Fig. 1. *Hesperantha vaginata*, Perdekraal, Calvinia; Fig. 2. *H. bachmannii*, Citrusdal; Fig. 3. *H. cucullata*, Nieuwoudtville, early evening display; Fig. 4. *H. pauciflora*, Kamiesberg; Fig. 5. *H. luticola*, Middelpos; Fig. 6. *H. elsiae*, Cedarberg; note the included anthers and style branches.

species are recognised, 14 of which are new species. Most of these were discovered in the years following Foster's (1948) study, partly as a result of the extensive exploration of the Cape mountain flora by Elsie Esterhuysen, whose contribution to our botanical knowledge of this region is without parallel. Three species were discovered by myself, two of these, *H. purpurea* and *H. quadrangula*, during the course of this study.

RELATIONSHIPS

Hesperantha, a member of the predominantly African subfamily Ixioideae, is generally recognised as being closely allied to the large, mainly Cape genus, *Geissorhiza* (ca. 70 spp.) (Lewis, 1954; Goldblatt, 1971) and the two are often confused. Species of these genera are superficially alike, being similar in size, in general appearance, and in having globose corms with woody tunics. The concentric corm tunics of *Hesperantha* section *Concentrica* and of *Geissorhiza* subgenus *Weihea* are in fact identical (Goldblatt, in prep.). Members of other sections of *Hesperantha* and of subgenera of *Geissorhiza* have different and often distinctive corm tunics. The important difference, however, between *Hesperantha* and *Geissorhiza* is in the structure of the style. Typically the style of *Hesperantha* is divided at the apex of the well-developed perianth tube, and the style branches are long and rather irregularly spreading. In *Hesperantha saldanhae, H. elsiae* and *H. cedarmontana*, the style divides well within the tube and in the last mentioned, the branches may not emerge at all.

In contrast, the style of *Geissorhiza* is typically long, and well exserted from the usually very short perianth tube, and has short, recurved branches. Exceptions are *G. spiralis* (Burchell) de Vos and *G. corrugata* Klatt with relatively long style branches that divide a short distance beyond the mouth of a wide perianth tube; and *G. cedarmontana* Goldbl. ined. and *G. esterhuyseniae* Goldbl. ined. in which the remarkably short style and style branches are included in the lower part of a long perianth tube. These species can only be distinguished from *Hesperantha* by several associated characters of bract and leaf structure.

It seems very likely that *Hesperantha* and *Geissorhiza* arose from a common ancestor with a concentric type of corm tunic, and that the two diverged along different lines, *Hesperantha* being primarily specialised for moth pollination, with its pale, scented, night-blooming flowers and well-developed perianth tube, and *Geissorhiza* primarily bee-pollinated and day-blooming with brightly coloured, scentless flowers and typically short perianth tube.

The monotypic southern African *Schizostylis* matches *Hesperantha* in all respects except in its rootstock, a rhizome-like structure. *Schizostylis* is aquatic or semi-aquatic and may be secondarily rhizomatous, with the corm degenerate because of its moist habitat. Corm-like structures are produced from the above-ground internodes of *Schizostylis*.

Hesperantha, Schizostylis, and *Geissorhiza* have a common basic chromosome number and karyotype, with $x = 13$. These three genera, together with the monotypic *Melasphaerula* ($n = 11$), were united in subtribe Hesperanthinae (Goldblatt, 1971) and are apparently mostly closely related to Gladiolinae ($x = 15$), sharing with this subtribe undivided style branches and primitively herbaceous bracts. Relationships of genera of Ixioideae are, however, difficult to assess at present and detailed tribal and infratribal classification is highly speculative and perhaps premature.

TAXONOMIC HISTORY

The first few species of *Hesperantha* to be recorded were all from the south western Cape, having been collected by botanists and explorers based at the Dutch settlement at Cape Town. Like other species of Iridaceae with more or less actinomorphic, stellate flowers, and spicate inflorescences, they were initially assigned to *Ixia*, or occasionally to *Gladiolus*. N. L. Burman has the distinction of having formally described the first species of *Hesperantha*, namely *H. spicata*, as *Ixia spicata* (Burman, 1768). The source of Burman's specimens is unrecorded. During the later Linnaean period, the Swedes Anders Sparrman and Carl Peter Thunberg, both living at the Cape for some time, collected several more species, and Thunberg's collections and manuscripts formed the basis for three species of *Hesperantha* first briefly described by the younger Linnaeus in 1782, as *Ixia falcata, I. pilosa* and *I. cinnamomea*, the later identical with Burman's *I. spicata*. Subsequently, Thunberg in 1783, published more complete descriptions of these species, and a fourth, *Hesperantha radiata*, which he misidentified as *Gladiolus recurvus* L. (Thunberg, 1784).

At about the same time Nicholas Jacquin, working in Vienna, was aquiring South African plants from two poorly-known collectors, Francis Boos and George Schol (Garside, 1942). Jacquin grew and, subsequently, figured *Hesperantha radiata* and *H. falcata*, naming the former *Ixia radiata* and the latter *I. linearis* (a homonym) which he soon changed to *I. angusta* (Jacquin, 1793).

Hesperantha was only recognised as a genus distinct from *Ixia* at the beginning of the nineteenth century when Ker (1805) segregated from this large and diverse genus not only *Hesperantha* but *Geissorhiza, Tritonia, Sparaxis* and *Romulea* (as *Trichonema*). Ker admitted to *Hesperantha* all the species then known, although he was evidently unaware of Burman's earlier name *I. spicata* for *H. cinnamomea*. Ker recognised as distinct both *H. fal-*

TABLE 1.

The species of *Hesperantha* of the winter rainfall area of southern Africa, arranged in systematic order by section, with summary of their distribution ranges.

	Section *Concentrica*	
1.	*H. erecta* (Baker) Benth. ex Baker	west coast, Mamre to lower Olifants River
2.	*H. namaquana* Goldbl.	S Namaqualand, Bitterfontein to Nuwerus
3.	*H. acuta* (Licht. ex Roem. & Schult.) Ker	Worcester to George, W and S Karoo
4.	*H. montigena* Goldbl.	western Cape mts, at high altitudes
5.	*H. pilosa* (L.f.) Ker	
	—— subsp. *pilosa*	W Cape, Caledon–Nieuwoudtville, Roggeveld
	—— subsp. *latifolia* Goldbl.	Roggeveld escarpment north to Kliprand
6.	*H. ciliolata* Goldbl.	Sneeukrans, Roggeveld escarpment
7.	*H. rivulicola* Goldbl.	Calvinia district, along streams
8.	*H. quadrangula* Goldbl.	Hantamsberg massif, Calvinia
9.	*H. flexuosa* Klatt	Namaqualand
10.	*H. minima* (Baker) Foster	Kamiesberg, Namaqualand
11.	*H. fibrosa* Baker	SW Cape, Houw Hoek to Heidelberg
	Section *Imbricata*	
12.	*H. longituba* (Klatt) Baker	eastern Karoo and eastern Cape
13.	*H. cucullata* Klatt	western Karoo, Nieuwoudtville to Roggeveld
14.	*H. vaginata* (Sweet) Goldbl.	Calvinia district
15.	*H. karooica* Goldbl.	foot of the Hantamsberg, Calvinia
16.	*H. humilis* Baker	Roggeveld and Witteberg
17.	*H. flava* Lewis	Matjiesfontein Karoo and N Namaqualand
18.	*H. hantamensis* Schltr. ex Foster	Calvinia district
19.	*H. purpurea* Goldbl.	western Karoo NW of Calvinia
20.	*H. oligantha* (Diels) Goldbl.	Hantamsberg massif
21.	*H. pallescens* Goldb.	lower S slopes, Olifants River Mts
22.	*H. bachmannii* Baker	widespread, Namaqualand, W karoo, W to E Cape
23.	*H. bulbifera* Baker	Somerset East (and Transvaal), montane in cliffs
	Section *Hesperantha*	
24.	*H. falcata* (L.f.) Ker	widespread, Lokenburg to Port Elizabeth
25.	*H. cedarmontana* Goldbl.	higher altitudes, W Cape mts, Pakhuis to Piketberg
26.	*H. pauciflora* Lewis	Nieuwoudtville escarpment and Namaqualand
27.	*H. latifolia* (Klatt) De Vos	Kamiesberg, Namaqualand, shallow pools
28.	*H. luticola* Goldbl.	Roggeveld escarpment to Hantamsberg, wet sites
29.	*H. spicata* (Burm.f.) N.E. Br.	
	—— subsp. *graminifolia* (Sweet) Goldbl.	Cape Peninsula to Wolseley, sandy soils

	—— subsp. *spicata*	Cape Peninsula to Piketberg, mainly clay soils
	—— subsp. *fistulosa* (Baker) Goldbl.	Porterville district, wet flats
30.	*H. saldanhae* Goldbl.	Saldanha district, Vredenburg granite outcrops
	Section *Radiata*	
31.	*H. brevifolia* Goldbl.	western Cape mts, Worcester to Piketberg
32.	*H. radiata* (Jacq.) Ker	widespread, Namaqualand to Swaziland
33.	*H. marlothii* Foster	Roggeveld escarpment to Nieuwoudtville
34.	*H. muirii* (L. Bolus) Lewis	S Cape, Bredasdorp to Albertinia
35.	*H. juncifolia* Goldbl.	S Cape, Agulhas Peninsula, on limestone
36.	*H. elsiae* Goldbl.	Cedarberg Mts near Krom River

cata, and *H. angusta*, which are now believed to be conspecific (see discussion under *H. falcata*). Ker included one undescribed species, *H. virginea*, a nomen nudum, never subsequently validated, which is probably what is now known as *H. bachmannii*. Thus by 1805, six species of *Hesperantha*, all Cape species, were known to science.

During the early nineteenth century, the German explorer Lichtenstein collected the first specimens of *Hesperantha acuta*, described later by Roemer & Schultes (1817) as *Ixia acuta* while the Englishman, William Burchell, collected several species of *Hesperantha*, including *H. humilis, H. acuta*, and the common *H. radiata* in the interior, in the western Karoo. *H. humilis*, however, remained undescribed until much later (Baker, 1876). The taxonomically much-confused, yellow and black-flowered *Hesperantha vaginata* (Goldblatt & Barnard, 1970) was also described during this period by Robert Sweet who assigned it to *Geissorhiza* (Sweet, 1826). The original collector of the plants grown in England is unrecorded. Curiously, this striking species was not found again for almost 100 years. It was rediscovered on the Nieuwoudtville escarpment in the 1920's, and described as *H. metelerkampiae* (Bolus, 1927), while a clear yellow form was named *H. stanfordiae* shortly afterwards (Bolus, 1931).

The active collecting of the late 1820's and 1830's by Drège and by Ecklon & Zeyher produced numerous new species of *Hesperantha*. The range of the genus was extended by Drège to Namaqualand (where he collected *H. flexuosa, H. erecta, H. minima* and *H. latifolia*) while both Drège and Ecklon & Zeyher recorded the genus at the edge of the summer rainfall area in the eastern Cape. Here they collected *H. longituba* near Aliwal North and Drège found *H. disticha* (probably conspecific with *H. baurii*) along the Umtata River. These collections were neglected for several years, and only after 1865 did Klatt, and then Baker, begin to describe the new taxa lying in European herbaria. Klatt described six species of *Hesperantha* (in which he included some species of *Geissorhiza* as well) in the years

1866–1882, assigning *H. longituba* to *Geissorhiza* and the long-tubed, and stemless, *H. latifolia* to *Syringodea* from which it was only removed by De Vos in 1974. Klatt dealt not only with Drège and Ecklon & Zeyher collections, but with specimens gathered by the British collectors Thomas Cooper and James Bowker and by German botanists who collected in the north west Cape.

Strangely enough, before *Hesperantha* was reported in the literature as occurring beyond the confines of the southern African winter rainfall area, the genus was collected north of the equator, in Ethiopia, by Schimper in 1844, whose collections of *H. petitiana* were described variously as *Ixia petitiana* and *I. hochstetteriana* shortly afterward (Richard, 1850).

During the later third of the nineteenth century, botanical exploration in southern Africa, notably at the Cape and in Natal, by among others Harry Bolus, Peter MacOwan, John Medley Wood and Rudolph Schlechter, produced a number of new species, or what were thought to be new species. This new material was largely described by J. G. Baker in Britain, although many of the new species found by Schlechter were only described in 1948 by R. C. Foster, who took up many of Schlechter's manuscript names.

Collecting was extended within the winter rainfall area during the 20th century into several areas largely overlooked by the earlier collectors. Rudolf Marloth made important collections in the Roggeveld and Cold Bokkeveld, H. H. W. Pearson explored Namaqualand, while H. M. L. Bolus and her students surveyed the Bokkeveld (Van Rhyns Pass) escarpment and R. H. Compton the Witteberg and adjacent area. By the mid-1930's, almost all of the low and mid-altitude species had been discovered, though not always named, and those not described by H. M. L. Bolus and G. J. Lewis were named by R. C. Foster (1948) in his incomplete study of the genus.

The higher altitude species remained unknown until Elsie Esterhuysen, and amateurs such as Ernest Galpin and Thomas Stokoe began to survey the flora of the higher Cape Mountains. Esterhuysen discovered two of the new species described here for the first time, *H. elsiae* and *H. montigena*, and has made the main collections of a third, *H. cedarmontana*. Surprisingly, in spite of over two hundred years of plant exploration in the relatively small area of the winter rainfall area of South Africa, new species continue to be discovered. The only known collections of *H. luticola, H. karooica, H. ciliolata, H. saldanhae, H. juncifolia, H. purpurea* and *H. quadrangula* were all made in the last two decades. These recently discovered species have, as might be expected, fairly limited ranges and it seems likely that still more species remain to be found.

Geography of *Hesperantha* in the Winter Rainfall Area

The southern African winter rainfall region extends along the west coast from southern Namibia to Cape Point, and along the south coast to Port Elizabeth (Fig. 7). The eastern half of the south coast belt receives substantial summer precipitation, and is often regarded as a region of year-round rainfall. Inland, the winter rainfall belt extends to the edge of Bushmanland and into the western Karoo and in the south, to the Swartberg Mountains. Higher areas of the eastern Karoo also receive winter precipitation and here, as well as in the southern Cape, species of *Hesperantha* are spring-blooming, in response to the winter rains.

Species of *Hesperantha* occur almost throughout this area, but none have been recorded north of the Orange River, in Namibia. Of the 36 species

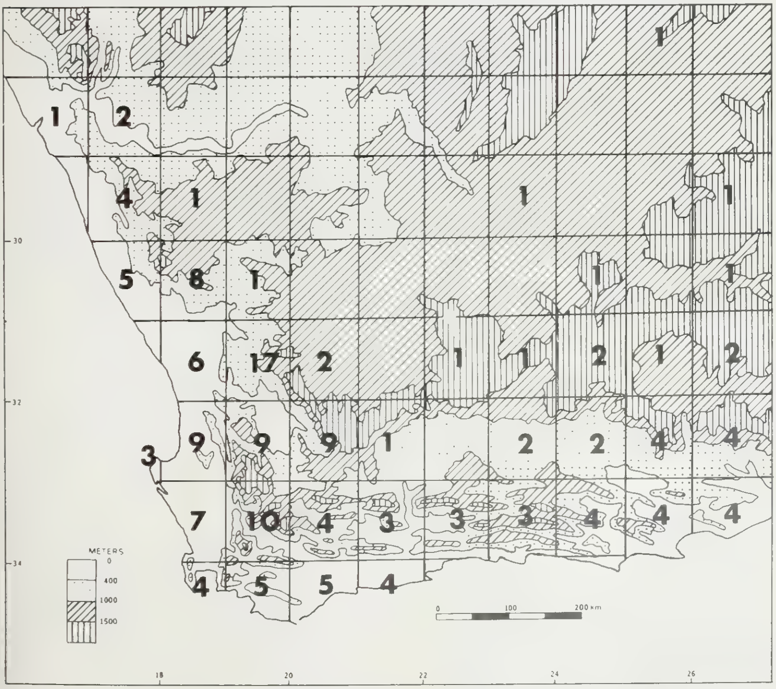


Fig. 7.
Concentration of species of *Hesperantha* in the winter rainfall area of Southern Africa and adjacent Karoo. The numbers indicate the total species recorded in each geographical degree square.

treated here two, *H. longituba* and *H. bulbifera*, occur only in the eastern Karoo and eastern Cape, essentially on the edges of the true winter rainfall belt, and are included here for convenience. Thus 34 species occur in the winter rainfall belt in a strict sense, and of these 32 occur exclusively in this area, while *H. bachmannii* and *H. radiata*, extend to the east into summer rainfall southern Africa. *Hesperantha bachmannii*, extends only along the coast as far as East London, but *H. radiata* (often treated as *H. tysonii* outside the winter rainfall area) occurs widely in the eastern Karoo, Transkei, and Drakensberg as far north as Swaziland. Strangely, these two species are also the most widespread within the winter rainfall area. *H. radiata* is ubiquitous and *H. bachmannii* almost so, but does not occur in the areas of highest rainfall and is absent from the Caledon and Cape Town districts.

The concentration of species is highest in the west (Fig. 7) indicating substantial radiation in this semi-arid, and summer dry area of rugged and varied landscape. Concentration falls sharply in the far north, where the climate is most arid, and in the eastern southern Cape where the climate is most equable.

Centres of Endemism

Calvinia District and the Nieuwoudtville Plateau: the area of highest species concentration is the Calvinia district. A total of seventeen species occur in the Calvinia grid 3119, of which seven species are endemic. In the eastern part of this grid, in the area immediately around the Hantamsberg, eleven species of *Hesperantha* grow and *H. hantamensis, H. purpurea, H. oligantha* and *H. karooica* (all section *Imbricata*) and *H. quadrangula* are endemic to this small area. *Hesperantha vaginata* and *H. rivulicola* extend from Calvinia to the western half of this grid, where *H. vaginata* is particularly common around Nieuwoudtville. West of Nieuwoudtville several more species are found in the northern tongue of the Cape Floristic Region that occurs on the sandstone soils of this area, including *H. falcata* and *H. marlothii*.

The Western Karoo: the western Karoo between Calvinia and Sutherland appears to constitute a second important area for speciation in *Hesperantha*. In addition to the endemic species mentioned for the Hantamsberg area around Calvinia, three species, *H. luticola, H. marlothii* and *H. humilis* are centred here (*H. marlothii* has one record from the Cold Bokkeveld to the west, while *H. humilis* occurs in the Witteberg to the south). *Hesperantha pilosa* subsp. *latifolia* is endemic in the western Karoo, while *H. ciliolata* is a local endemic found only in the Sneeukrans area of the escarpment north west of Sutherland. In all, some 18 species occur in the parts of grids

3119, 3120 and 3220 that constitute the western edge of the Karoo and of these nine are endemic here.

The Cedarberg, Cold Bokkeveld, Piketberg Mountain Centre: significant radiation has also occurred in the mountains to the west, in the Cold Bokkeveld, Olifants River, Cedarberg Mountain axis. Nine species occur in grid 3219 which constitutes most of this mountain belt and if the mountains of the eastern half of the adjacent grid are considered, a total of 12 species occurs in this mountain belt that forms the inland portion of the western half of the Cape Floristic Region. Three species are endemic in this area: *H. elsiae*, local in the southern Cedarberg, *H. pallescens* from the lower southern slopes of the Olifants River Mountains and *H. cedarmontana* which occurs at higher elevations in the Cedarberg and Pakhuis Mountains as well as on the Piketberg.

Western Cape Coast: most species of the western coastal belt of the Cape Flora Region are widespread, occurring elsewhere as well, but *Hesperantha erecta* is restricted here, extending from the Olifants River in the north to the Darling area. *Hesperantha spicata* is nearly restricted to this coastal belt but occurs on the Piketberg, and inland locally as well, but *H. spicata* subsp. *graminifolia* is endemic in the southern end of the coastal belt while *H. saldanhae* is a rare local endemic of the Saldanha Bay area.

Namaqualand: to the north in Namaqualand, the widespread *Hesperantha radiata* and *H. bachmannii* are fairly common and extend into the Richtersveld, but throughout this very arid area *H. radiata* is usually associated with moist habits, such as seeps or stream banks. In addition, there are four endemics in Namaqualand. *Hesperantha flexuosa* ranges from the Kamiesberg north to Steinkopf, *H. latifolia* is restricted to the Kamiesberg, both at high altitudes on the Rooiberg and at lower elevations such as Grootvlei, *H. minima*, a dwarf species, has been collected only once, on the Kamiesberg, by Drège in the 1830's, and *H. namaquama* is restricted to the hills between Bitterfontein and Nuwerus. A further two species occur in Namaqualand, *H. pauciflora* and *H. flava*, and both have unusual, disjunct ranges. *Hesperantha pauciflora* occurs in the Kamiesberg–Kamieskroon area, and on the Nieuwoudtville escarpment some distance to the south, while *H. flava* occurs on the shale outcrops of the Nama System near Steinkopf, and near Matjiesfontein in the south western Karoo. Both disjunctions are without parallel in Iridaceae.

The Southern Cape: in the southern Cape, *Hesperantha juncifolia* is the only local endemic. It has been collected only once, on limestone along the Agulhas coast. There are two more endemics in this area and these occur in the western and driest part of the southern Cape: *H. fibrosa* extends from Caledon to near Heidelberg, and *H. muirii* occurs from Bredasdorp to

Albertinia. The widespread *H. falcata, H. bachmannii* and *H. radiata* occur throughout the southern Cape, and in the east are the only common species, but the eastern Karoo species *H. longituba* occurs locally in dry sites and in the interior.

In summary, the western part of the southern African winter rainfall area is the centre for great radiation in *Hesperantha.* Within the region are several subcentres, each with endemic species. The western Karoo stands out as most significant with 18 species and nine endemics. Next in importance is the western Cape mountain belt of the Cedarberg, Pakhuis, Cold Bokkeveld and Olifants River Mountains as well as the Piketberg, with eleven species and three endemics. Nine species and four endemics occur in Namaqualand, eight species and two endemics occur in the western Cape coastal belt and in the western end of the southern Cape there are seven species and three endemics. Ten species have been recorded in the mountains of the south western Cape, including the Du Toits Kloof, French Hoek, Hex River and Riviersonderend Mountains of which only the subalpine *H. montigena* is endemic.

Ecology

Species of *Hesperantha* are typically small to very small plants and they form a minor component of the floral communities in which they occur. Plants are rarely noticeable unless they are in full bloom and then become conspicuous for a brief two or three weeks in the year. Most often, species grow in habitats where they are unlikely to be completely overgrown by surrounding vegetation. Such places include areas of thin, particularly stony, soils, or in very rocky situations where few plants can survive or grow to appreciable size. Several species occur exclusively or predominantly in such situations, particularly in a habitat that may be called a rock seep or rock flush (Goldblatt, 1979). These are more or less flat rock outcrops on which a thin layer of soil accumulates and in the wet season remains permanently moist as water percolates over the rocks. Species of several genera of Iridaceae occur in this habitat, some restricted to these sites, especially in the genus *Galaxia* (Goldblatt, 1979). *Hesperantha latifolia* and *H. montigena,* both montane species, are restricted to this habitat while *H. cedarmontana* grows in similar situations, but generally on the south side of boulders, and in crevices where roots penetrate to deeper levels.

Hesperantha luticola and *H. marlothii* of the Nieuwoudtville escarpment and western Karoo may be found in rock flush habitats, but they also occur on deeper soils in waterlogged and/or stony situations. The dwarf *H. luticola* blooms unusually early in the season, often in June or July, when the soil is still waterlogged and the surrounding vegetation has not begun spring growth. A few other species may occasionally be found in rock flush habitats, although they are typical of deeper soils: these include *H. pilosa* and *H. pauciflora.*

On deeper soils, species of *Hesperantha* occur on various substrates, but are seldom restricted to a particular soil type. Those species characteristic of the coarse, nutrient-poor sandy soils of the Cape System tend to be markedly fire-responsive, blooming only after fire has destroyed the typically dense sclerophyllous (fynbos) vegetation which forms the climax on such soils. *Hesperantha falcata, H. brevifolia, H. radiata, H. pilosa* and *H. spicata* are the most common species in this habitat, and they generally appear in profusion after fires. *Hesperantha radiata, H. pilosa* and *H. spicata* also occur on clay and shaley soils where plant communities are usually shorter and less dense and then bloom regularly, although they do benefit from clearing or heavy grazing of the surrounding bush. The South Cedarberg endemic, *H. elsiae,* also occurs on poor sandy mountain soil, but it apparently flowers well in the absence of fire.

Three species are restricted to clay soils in the south western Cape: *H. pallescens, H. fibrosa* and *H. muirii.* In the western Karoo the acaulescent *H. humilis, H. flava* and *H. hantamensis* occur on the characteristic shaley soils of this area where plant cover is sparser than in the south western Cape. In the western Karoo, two species, *H. vaginata* and *H. purpurea,* are restricted to local outcrops of heavy red fine-grained clay, either amongst rocks or in the open.

A few species grow on unusual substrates. These include *H. erecta* and the very local *H. saldanhae,* which are apparently restricted to granitic outcrops, where they grow in shallow soils among boulders. *Hesperantha juncifolia* is endemic on limestone and has only been recorded from one site on the Agulhas coast where limestone is common.

Within the winter rainfall area, *Hesperantha radiata* is notable for the diversity of situations in which it occurs. It is equally common on sandy flats, in stony, montane habitats or on clay soils among dwarf shrubs. In the extreme north of its range in Namaqualand, it is restricted to moister situations, while in the summer rainfall area it also grows in wet sites, either bogs, stream banks or seepage lines.

FLORAL PHENOLOGY

Flowers of species of *Hesperantha* usually last for two to four days, but exhibit characteristic diurnal rhythms of opening and closing. In general, the white or pale-coloured species are evening-blooming, and their flowers open and produce a strong scent in late afternoon to early evening and close later during the night. The first of these to open are the flowers of *H. falcata* (white-flowered forms), *H. bachmannii* and *H. cucullata,* which begin to unfold at about 17h00 (sometimes earlier), while flowers of *H. cedarmontana, H. pilosa, H. rivulicola* and others do not open until nearly dark after 18h30. The evening-blooming species often produce a spectacular display towards early evening when they are conspicuous in the failing sunlight. Such species are widely believed to be moth-pollinated (Vogel, 1954) but there are no critical observations on this subject. Marloth (1915: 145) comments that the early-blooming *H. falcata* is visited by moths, and this is illustrated in Fig. 42A (vol. 4, *Flora of South Africa*). Vogel (1954: 103) considers *Hesperantha* to be fundamentally a moth-pollinated genus.

Species or populations of species with coloured flowers are, in contrast, day-blooming and scentless, and their flowers close towards evening. Flowering times are characteristic for a species. The flowers of the blue and purple-flowered populations of *Hesperantha pilosa* in the Nieuwoudtville area and in the Roggeveld open shortly after dawn and close at about 13h00. More commonly, coloured flowers open at about 11h00, when temperatures are warm, and then close between 16h00–17h00. *Hesperantha pauciflora* is unusual in having flowers that only open after noon and close between 16h00 and 16h30. A species with an even shorter flowering time is *H. vaginata,* the yellow and black (rarely clear yellow) flowers of which open at about 15h00 and close toward 18h00. Vogel (1954) speculates that such species are bee-pollinated, but no observations have been recorded. The bright yellow and long-tubed flowers of *H. flava* are apparently unusual in being evening-blooming. Vogel (1954: 104) reports that this species is pollinated by hawk moths and he suggests that other long-tubed evening-blooming species (e.g. *H. longituba, H. pulchra*) may also be pollinated in this way.

The diurnal pattern of flowering is very striking in the Nieuwoudtville area where several species are sympatric. First to bloom is the blue form of *H. pilosa* (06h00–13h00) followed by the dark pink-flowered *H. pauciflora* (12h00–16h30) and nearby, but in a different habitat, *H. vaginata* (15h00–18h00) followed by *H. cucullata* and *H. bachmannii* (16h00–17h00) and then *H. radiata* (about 18h00). All these species excepting the curved-tubed *H. bachmannii* and *H. radiata,* have flowers of essentially identical form and proportion, and differ only in their colour and flowering time. The diurnal replacement of flowering time of one species by another through the day suggests that this mode of speciation may be important in *Hesperantha,* perhaps accounting for the evolution of several species in the genus.

Breeding Systems

In general species of *Hesperantha* can be said to be modally outcrossing, their relatively large and conspicuous flowers readily attracting insect visitors that accomplish pollination. Several species have been observed in the greenhouse and of these only two, *H. radiata* and *H. pauciflora*, have proved to be strongly self-incompatible.

Several more, including *Hesperantha cucullata, H. marlothii, H. bachmannii, H. erecta, H. pilosa, H. petitiana* (a tropical African species) and four populations of *H. falcata*, are what may be termed facultatively self-compatible to autogamous. In these species a number of capsules on a spike (never all) will set seed by their own pollen (either transferred by hand or by normal contact between style branch and anther). These capsules are occasionally as large but usually somewhat smaller than those that develop after cross-pollination. However, they may only contain a much reduced number of seeds (sometimes 1–3 seeds per capsule).

The small-flowered form of *Hesperantha falcata* from the southern Cape as well as three long-tubed and large-flowered species, *H. pallescens, H. purpurea* and *H. latifolia*, are evidently autogamous. This is unexpected in *H. pallescens, H. purpurea* and *H. latifolia* in view of their large, fairly conspicuous and scented long-tubed flowers.

Vegetative reproduction occurs in a few species to a limited extent by the production of two or more basal cormlets annually. A few species, notably *Hesperantha pallescens* and *H. bachmannii*, however, produce large numbers of tiny basal cormlets around the main corm, and this ability must enhance their reproductive and survival capabilities. In some forms of *H. radiata* several large corms are also regularly produced at the base.

Hybrids

No natural hybrids have been recorded in *Hesperantha* despite the fact that species are frequently sympatric. This may be attributed to breeding barriers between species especially those taxonomically distant (see below) or to differences in pollinators and timing of the opening and closing of the flowers.

In the greenhouse, experimental hybrids can sometimes be produced, but rarely between species in different sections. More often crosses succeed between closely related species within the same section. Of attempts between pairs of species, two out of four intrasectional crosses were successful and only two out of ten intersectional crosses succeeded. In section *Imbricata, H. bachmannii* and *H. pallescens* can easily be crossed, while in section *Hesperantha, H. falcata* and *H. pauciflora* also cross. In the same section the autogamous *H. latifolia* could not be crossed with either *H. falcata* or *H. pauciflora.*

The only intersectional hybrids obtained were between *H. erecta* x

H. bachmannii and *H. erecta* x *H. pauciflora*. Only one cross between each succeeded and the results require confirmation.

These results are somewhat unusual in subfamily Ixioideae where more often interspecific crosses can be made with relative ease between all species of a genus and even between some genera (Goldblatt, 1971). The best known example of the ease of crossing species in the subfamily is *Gladiolus* (ca. 150 spp.) while *Freesia* (Goldblatt, 1981) is another good example of a genus in which interspecific crosses can be made between distantly related taxa.

CYTOLOGY

Hesperantha is unusually uniform cytologically. The basic chromosome number is $x = 13$ (Fernandez & Neves, 1961; Goldblatt, 1971), this having been established on the basis of counts for 12 species (one now reduced to synonymy). Original counts for 26 species are presented here (Table 2) of which 16 are first reports for species, making a total of 27 species, a little over half the total in the genus, for which the chromosome number is now known. All but two of the species counted are from the winter rainfall area. Counts for nearly all species, including as many as four or five populations of some, are diploid, $2n = 26$. One exception is *H. purpurea* where triploid as well as diploid individuals were encountered. B chromosomes have been recorded in one species, *H. luticola*, $2n = 26 + 2B$.

The basic number of $x = 13$ is somewhat unusual in Iridaceae, but it is shared by *Geissorhiza* (ca. 70 spp.) and *Schizostylis* (1 or 2 spp.) (Goldblatt, 1971). Both these genera are closely related to *Hesperantha* and all three have a common karyotype, which consists of fairly small meta- to submetacentric chromosomes that range in size from 2,5–4 μm.

CONSERVATION

Most species of *Hesperantha* in the winter rainfall area are in little danger at present as they tend to grow in semi-arid areas or are sufficiently common and widespread. However, a number of the more local endemics comprise few or very small populations and relatively minor local events could severely reduce numbers so that the species may come close to extinction. Species in this category known from only one or few populations and which have been collected recently and are well known are *H. vaginata, H. karooica, H. hantamensis, H. purpurea, H. pallescens, H. namaquana* and *H. elsiae*. Of these, *H. vaginata*, known from three localities in the Calvinia district, seems reasonably secure but a change in farming practice on the rich red clay soil on which it grows could conceivably rapidly reduce the present large populations to near extinction.

TABLE 2.

Chromosome numbers in *Hesperantha*. Original counts are marked with an asterisk. All localities are in South Africa, and unless otherwise stated, in the Cape Province. Previous counts were reported by Goldblatt (1971).

Species	Diploid Number	Collection Data
H. acuta	26*	Karoo Garden, Worcester, *Compton 20743* (NBG)
H. bachmannii	26	Nieuwoudtville, *Goldblatt 229* (BOL) (as *H. angusta*)
	26*	North of Hankey, *Goldblatt 4937* (MO);Wildepaardehoek Pass, Namaqualand, *Goldblatt 5754* (MO)
H. baurii	26	Graskop, Transvaal, *Goldblatt 72* (J)
H. brevifolia	26*	Piketberg, Zebrakop, *Esterhuysen 35320* (MO)
H. cedarmontana	26*	Cedarberg, Middelberg Plateau, *Goldblatt 5130* (MO); Pakhuis Pass, *Goldblatt 6403* (MO)
H. cucullata	26	Nieuwoudtville, *Goldblatt 243* (BOL) (as *H. buhrii*)
	26*	Nieuwoudtville, Glenlyon, *Goldblatt 3954* (MO)
H. elsiae	26*	Cedarberg, top of Krom River Kloof, *Goldblatt 5331* (MO)
H. erecta	26*	Saldanha distr., Donkergat, Posberg, *Goldblatt 4095* (MO)
H. falcata	26	Cape Point Reserve, Cape Peninsula, *Goldblatt 149* (J)
	26*	Malmesbury, commonage, *Goldblatt s.n.* no voucher; Tulbagh falls, *Goldblatt 4763* (MO); Near Tulbagh, *Goldblatt 4756* (MO); The Rest, Piekeniers Kloof, *Goldblatt 5644* (MO); Caledon distr., Sandys Glen road, Fairfield, *Goldblatt 4847* (MO)
H. fibrosa	26*	Caledon distr., Commonage S of town, *Goldblatt 6199* (MO)
H. flava	26*	Steinkopf, Namaqualand, *Goldblatt 5750* (MO); Ghaap Kop, near Matjiesfontein, *Goldblatt 6074* (MO)
H. flexuosa	26	Springbok, *Goldblatt 191* (BOL)
	26*	Wildepaardehoek Pass, *Goldblatt 5755* (MO)
H. humilis	26*	Worcester distr., near Matroosberg Station, *Goldblatt s.n.* no voucher; Roggeveld NW of Sutherland at Voëlfontein, *Goldblatt 6340* (MO)
H. huttonii	26	Graskop, Transvaal, *Goldblatt 73* (J) (as *H. longituba*)
	26*	Katberg, cliffs along pass, *Goldblatt 5455* (MO)
H. latifolia	26*	Kamiesberg, Rooiberg slopes, *Goldblatt 5760* (MO)
H. luticola	26* & 2B	Calvinia–Middelpos rd., near Blomfontein, *Goldblatt 5814* (MO)

H. montigena	26*	Worcester distr., Mt Brodie, *Esterhuysen 35307* (MO); Milner Peak, Hex R. Mts, *Esterhuysen 35528* (MO)
H. marlothii	26*	Calvinia–Middelpos rd., near Blomfontein, *Goldblatt 5813* (MO); Nieuwoudtville escarpment, *Goldblatt 5835A* (MO)
H. muirii	26*	Hills W of Riversdale, *Goldblatt 5189* (MO)
H. pauciflora	26	Nieuwoudtville, *Goldblatt 231* (BOL)
	26*	Kamiesberg, Welkom, *Goldblatt s.n.* no voucher
H. pallescens	26*	Foot of Piekenierskloof Pass, *Goldblatt 5645* (MO)
H. pilosa subsp. *pilosa*	26	Nieuwoudtville, Grasberg rd., *Goldblatt 272* (BOL); Nieuwoudtville, *Goldblatt 284* (BOL) (as *H. puberula*)
	26*	Cedarberg, Middelberg Plateau, *Goldblatt 5134* (MO); Calvinia–Middelpos rd., near Blomfontein, *Goldblatt 5810* (MO)
H. purpurea	26, 39*	Perdekraal, NW of Calvinia, *Goldblatt 6246* (MO)
H. radiata	26	Touws River, *Goldblatt 146* (J)
	26*	Malmesbury, commonage, *Goldblatt 6283* (MO); North end of Cold Bokkeveld, *Goldblatt 5343* (MO)
H. rivulicola	26*	Calvinia, along water courses, *Goldblatt 5807* (MO)
H. spicata subsp. *graminifolia*	26	Darling, *Goldblatt 416* (BOL) (as *H. spicata*)
	26*	Cape Peninsula, slopes N of Cape Pt. Reserve *Goldblatt 5263* (MO)
H. vaginata	26	Nieuwoudtville, NW Cape, *Goldblatt 259* (BOL); *Goldblatt 93* (J) (as *H. stanfordiae*)
	26*	Perdekraal, NW of Calvinia, *Goldblatt 6229* (MO)

Hesperantha pallescens may have a slightly wider range than the present record indicates but its known distribution is limited to a few metres of roadside and wheatfield margin below Piekeniers Kloof Pass. Minor road widening or the extension of the ploughed land would exterminate entirely the only known population.

Two species, *Hesperantha hantamensis* and *H. karooica,* are recorded only from the flats at the foot of the Hantamsberg near Calvinia. This area is partly included in a nature reserve but the species occur in such a restricted area that road widening or extension of the Akkerendam Dam in the reserve could immediately endanger them. Both are very small and inconspicuous so that it is possible that they have a wider range than is recorded and perhaps their future may be more secure than it appears.

The other very localised species mentioned above, *Hesperantha purpurea, H. namaquana* and *H. elsiae*, seem secure in spite of their small recorded ranges, as they grow in rocky sites in localities distant from human activity.

A special category of species must be mentioned, those known from only a single locality and collection. These include *Hesperantha minima, H. oligantha, H. ciliolata, H. saldanhae* and *H. juncifolia,* none of which has been found recently. Their conservation status is difficult to determine. *Hesperantha saldanhae,* which was collected near Saldanha Bay, may be extinct. Urban and industrial expansion has taken place rapidly here in the last decade and several collecting expeditions to the area have failed to locate the species. The limestone endemic *H. juncifolia* must also be severely threatened, as is much of the flora of the limestone areas of the southern Cape, by the spread of alien shrubs and trees, particularly *Acacia cyclops* and *Leptospermum laevigatum* which are choking the native and highly endemic limestone flora. *Hesperantha minima, H. oligantha* and *H. ciliolata* are probably little threatened as they occur in places far from roads or towns but efforts should nevertheless be made to discover more about these species.

The ranges of two fairly widespread species, *Hesperantha fibrosa* and *H. muirii,* have been much reduced in the last forty years by increases in agricultural activity in the southern and south western Cape. However, sufficient populations of the species still occur for them to be considered not actively threatened.

SUBGENERIC CLASSIFICATION

The subgeneric classification followed here was first outlined in 1982 (Goldblatt, 1982b) in a treatment in which corm characteristics were strongly emphasised. This classification distributes the winter rainfall area species of *Hesperantha* among four sections. The least specialised of these is believed to be section *Concentrica*, all species of which have asymmetric corms with concentric corm tunics (Fig. 8 A–E). The species of section *Imbricata* have asymmetric to almost symmetric corms with imbricate tunics, the older layers of which are displaced upwards and notched below (Fig. 8 F–H). Corms in the species of section *Hesperantha* are symmetric, and triangular to campanulate with a broad flat side (Fig. 8 I–L). The species of the specialised section *Radiata* have globose or flat-sided corms with imbricate tunics, and are peculiar in having unusual bracts in which the margins are united below for some distance around the spike axis and flowers which typically have a curved perianth tube (Fig. 30–32).

The largest of the sections is section *Concentrica* with some 25 species of which 11 occur in the winter rainfall area and the Karoo. The section ex-

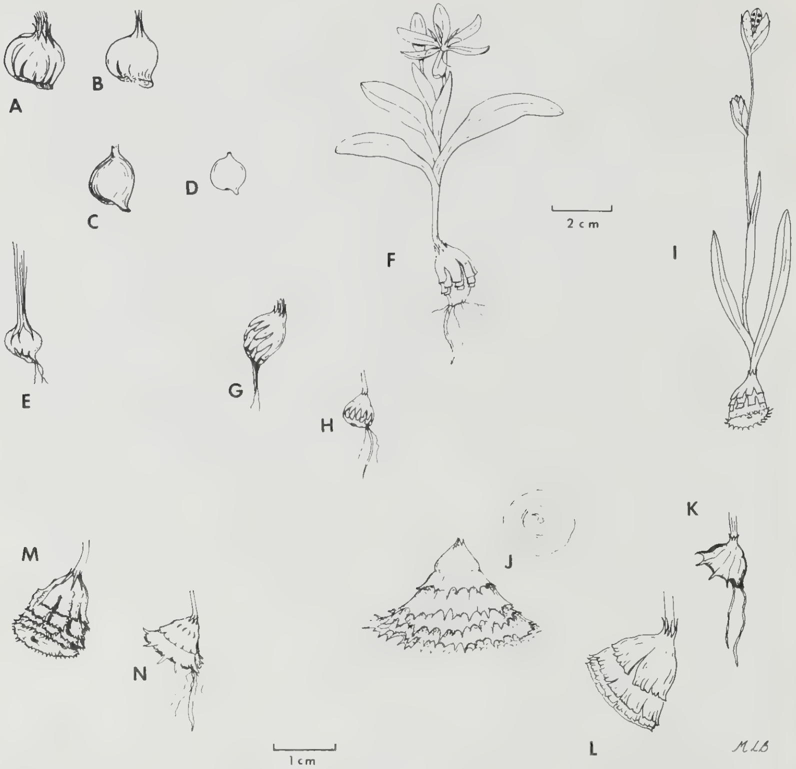


FIG. 8

Corm morphology in *Hesperantha*: A–C: *H. pilosa* with tunic layers progressively removed and D the naked corm; E; *H. fibrosa*; F: *H. humilis*; G: *H. pallescens*; H: *H. bachmannii*; I: *H. cedarmontana*; J: *H. falcata*–naked corm with tunics removed and the intact corm; K: *H. luticola*; L: *H. spicata*; M: *H. radiata*; N: *H. marlothii* (all ± life-size except F and I, × 0,5).

tends through eastern southern Africa into the mountains of central Africa, Ethiopia and Cameroun. Section *Imbricata* is found mainly in the Karoo and it has radiated extensively in the western Karoo where 10 of the 12 species occur. Only two species of section *Imbricata* extend to any degree outside the winter rainfall area, *H. longituba* (eastern Karoo) and *H. bulbifera* (Boschberg to the Transvaal). Section *Radiata*, comprising only seven to nine species, occurs throughout southern Africa, but only *H. radiata* as well as *H. longicollis* and *H. ballii* occur outside the winter rainfall area, the latter two endemic to eastern southern Africa. Section *Hesperantha*, comprising seven species, is entirely restricted to the winter rainfall area and extends from northern Namaqualand to Port Elizabeth.

Formal descriptions of the sections as well as a brief discussion of the variation encountered in each section are presented in the taxonomic treatment.

MORPHOLOGY

Rootstock

The rootstock is a corm with distinctive hard woody (rarely brittle-papery) tunics. The morphology of the corm and the corm tunics have been described in detail in an earlier paper (Goldblatt, 1982b) but is recounted briefly here. The live portion of the corm is a small white structure consisting of a single swollen internode, with a minute apical bud (Fig. 8 D, J). It is always asymmetric, being somewhat flattened on one side or towards the base, and it has a peculiar down-pointing projection at the lower end of the flattened side. This projection is the point from which the roots are produced.

Tunic morphology is variable in *Hesperantha* (Goldblatt, 1982b) and, as an important taxonomic character in *Hesperantha*, the tunics are an invaluable guide to natural relationships. Shape of the tunics reflects to some extent that of the internal corm but often the presence of the lateral projection is not indicated by any external feature.

There are two distinct tunic types, concentric and imbricate (in the terminology of Foster, 1941; 1948). In the concentric type, the corms are usually small, of constant size, and the old tunic layers split from base and apex into somewhat elliptic sections which completely enclose the new tunic layers produced in successive years. In corms of this type, characteristic of section *Concentrica* and here represented by *H. pilosa* (Fig. 8 A–D), one side is obliquely flattened below and the lower end is produced into a down-pointing projection from which the roots emerge, and is thus essentially asymmetric. *Hesperantha fibrosa* stands out in this section in having the tunics drawn into long fibres above (Fig. 8 E).

In corms with imbricate tunics (Fig. 8 F–N) the older layers are split in the lower part and displaced upwards. As successive layers accumulate above, the tunics overlap one another in a distinctive way. The upward displacement of the older tunics is usually easy to determine, but occasionally the displacement is minimal and then the tunic type is difficult to recognise.

Imbricate corm tunics are found in the remaining sections of the genus.

Typical examples of species with imbricate tunics are *H. humilis* and *H. pallescens* (both section *Imbricata*) (Fig. 8 F, G) in which the corm is more or less globose with one side flattened below. The smaller corm of *H. bachmannii* (Fig. 8 H), also section *Imbricata*, is virtually symmetric externally but has similar overlapping tunic layers. In section *Hesperantha* the corms are symmetric, and campanulate to triangular in outline with a broad flat side, e.g. *H. falcata* and *H. cedarmontana* (Fig. 8 J, K). The flat side is actually not basal in the ground, but oblique or even vertical. In some forms of *H. falcata* and several other species of the section, spines are produced from the lower margins of the tunic, e.g. *H. luticola* (Fig. 8 K). In *H. spicata* and *H. saldanhae* the lower margins are entire or lightly frayed.

Such apparently symmetric corms are also found in some species of section *Radiata* in which there are two corm types. In many forms of *H. radiata* (Fig. 8 M) and in *H. muirii, H. elsiae, H. brevifolia* and *H. juncifolia* the lower margins are incised below into more or less rectangular segments, and each segment has slightly fringed edges that curve outwards, making the tunics appear to be composed of concave sections. The very characteristic development is strangely not found in all populations of *H. radiata.* In other forms the corms are campanulate with the lower margins of the tunics unevenly toothed, while in *H. marlothii* (Fig. 8 N), the lower part of the tunic layers are produced into long spines.

Leaves

Cataphyll: there is usually a single transparent and membranous cataphyll sheathing the stem base below ground, but this is often lacking or fragmentary in dry material. The cataphyll of *Hesperantha quadrangula* stands out as being rather robust and conspicuously yellowish-brown, and it is a good marker for this otherwise rather undistinguished species.

Produced leaves: these are defined as having a free, unifacial apex as opposed to stem bracts which are entirely sheathing. There may be from 3 (rarely 2) to several produced leaves and in most species the number is quite constant. The primitive state is presumed to be several as in *H. cucullata, H. falcata, H. semipatula*, species of section *Radiata* and several others, and the number is variable in these species.

The number is fixed in a large number of species and the usual pattern is two large basal leaves, and a third subbasal or cauline and partly sheathing leaf. This latter is often conspicuous, being larger, and sheathing for much of its length (e.g. *H. quadrangula, H. flexuosa, H. pilosa*) and is sometimes inflated and spathe-like. Species with consistently three leaves without a bract leaf are *H. fibrosa, H. flexuosa, H. quadrangula* and *H. rivulicola*, but three leaves also occur in depauperate specimens of other species, notably *H. falcata*. Leaf shape is typically ensiform to linear, acute and erect or erect-falcate. The leaves of *H. quadrangula* are unusual in being oblong and obtuse. In *H. humilis, H. flava* and *H. hantamensis*, the leaves are falcate and obtuse, and generally distinctive. Texture is unusually thin in *H. bachmannii* and *H. pallescens*, but leaves of most other species are normally firm but not notably ribbed. An exception is *H. ciliolata* which has multi-ribbed leaves, and the narrow intervening grooves are covered by dense, microscopic cilia. The leaves of *H. pilosa* are pilose.

Bract leaves: these range from green and leaf-like, but entirely sheathing, to membranous and are sometimes reduced to scales. The presence of a bract leaf is usually constant in a species and is a notable feature of *H. spicata, H. acuta*, etc. In *H. pilosa* subsp. *latifolia* the bract leaves are pilose, and sometimes very short to membranous, while in *H. pilosa* subsp. *pilosa* and the presumably allied *H. ciliata*, this bract is reduced and usually a membranous structure, often only 1–3 mm long.

Stem

The stem is typically erect, smooth, terete and produced well above the ground. It is however, partly to entirely subterranean in *Hesperantha humilis, H. flava* and *H. hantamensis* (section *Imbricata*) in *H. luticola* and usually so in *H. latifolia* (both section *Hesperantha*). To compensate for the lack of stem, these species all have an unusually long perianth tube.

The stem is usually sheathed below by leaf bases, and in many species the third leaf is specialised as a sheath which envelopes the lower half of the stem. The upper half of the stem may be naked, or bear a specialised bract leaf (see previous section). The stem is usually, but not invariably pilose in *H. pilosa*. Branching is very variable, but certain species such as *H. pilosa, H. quadrangula, H. spicata, H. elsiae* and all species of section *Radiata* produce branches only rarely.

Inflorescence

This is a spike of several (rarely one) flowers and may be more or less straight to markedly flexuose. The number of blooms is variable depending on age and health of the plants and seasonal and soil conditions. The acaulescent species typically have fewest flowered spikes.

The floral bracts are paired, the outer and larger enclosing an opposed inner, narrower and usually shorter one. The inner bract has been used very little as a taxonomic character. It is a double structure with two main veins and a forked apex.

The outer bracts are herbaceous, and firm in texture, but often become dry from the apex soon after blooming. In section *Radiata* the outer bracts have margins partly united round the stems (or inner bracts in the case of the terminal flower). In *Hesperantha radiata* the margins may be joined for as much as two-thirds of their length, imparting a very characteristic appearance to the spike. There is little to distinguish the bracts of other species with the exception of the acaulescent group of *H. humilis, H. flava* and *H. hantamensis*, where the outer bracts are larger than usual, firm-textured and keeled, and much longer than the quite membranous inner bracts.

Flower

Most species of *Hesperantha* have very similar actinomorphic flowers with a well-developed, straight, slender cylindric perianth tube and horizontally extended tepals. The tube is generally about as long as the bracts which surround the tube, but after fertilisation the tube becomes exserted a few millimetres from the bracts due to the rapid enlargement of the ovary.

Longer and typically exserted perianth tubes are characteristic of all acaulescent species, and of some other winter rainfall area species such as *Hesperantha elsiae, H. cedarmontana, H. namaquana, H. longituba, H. pallescens, H. purpurea* and *H. oligantha*. Curved tubes are found in *H. bachmannii, H. bulbifera* (section *Imbricata*) and in most species of section *Radiata*, but particularly in *H. radiata* and *H. marlothii*, in which the flowers face downwards.

In the majority of species of the winter rainfall area flower colour is white or cream with some red to brown colouration on the reverse of the outer tepals. Such flowers are usually evening blooming, opening at times specific for a population or species, between 16h00–19h00, and closing at various times before daybreak. A strong scent is released on opening. These flowers are presumed to be moth-pollinated.

Some species in each section have highly coloured flowers (Figs 1, 4, 6) and these usually open during the day and close before nightfall. Day-blooming species are *Hesperantha vaginata* (flowers yellow usually with contrasting black markings), *H. humilis* (pink to red), *H. purpurea* (red-purple), *H. pallescens* (pale yellow), *H. elsiae* (pink), *H. pauciflora* and *H. latifolia* (both pink to reddish-purple). Presumably *H. karooica* (yellow flowers) and *H. oligantha* (purple flowers) are also day blooming but I have not seen these species alive and the information is not recorded. *Hesperantha flava* is exceptional in having bright yellow flowers and being night blooming.

In two species with typically white and night-blooming flowers, *Hesperantha falcata* and *H. pilosa*, there are populations with coloured and day-blooming flowers. Coloured flowers forms are yellow to cream in *H. falcata*, and blue to purple in *H. pilosa*. In both species evidence suggests that coloured flowers have evolved independently in several isolated populations. Some of these populations have been described as distinct species or varieties (e.g. *H. lutea, H. puberula, H. bracteolata*), but have no correlated morphological characters that distinguish them apart from flower colour, and none of these colour forms is given taxonomic recognition in this treatment.

Stamens

The three stamens typically have well-developed filaments inserted on the perianth at the apex of the tube. In *Hesperantha saldanhae* the filaments are unusually short, ca. 1 mm long, and the anthers appear sessile. In *H. elsiae* (section *Radiata*) and *H. cedarmontana* (section *Hesperantha*) the filaments are inserted well within the perianth tube and are relatively short. The large-flowered *H. purpurea* is also unusual in having disproportionately short filaments ca. 2 mm long.

The anthers are usually somewhat longer than the filaments, and erect to ascending, or articulated at the filament apex and then horizontal (e.g. *H. cucculata, H. humilis*). In *H. elsiae* and *H. cedarmontana* the anthers are included in the perianth tube but in the latter the anther apices reach the mouth of the tube. Anther size is generally a good taxonomic character as it is fairly constant in a species, and easy to measure.

Gynoecium

Style: typically the style is filiform, and divides at the apex of the perianth tube, to form three, long and diverging branches that spread horizontally. Although this character is one which defines the genus, there is some variation. In species with flowers facing to the side or towards the ground, the style branches are pendent, and tend to become unilateral. This is especially noticeable in *H. radiata, H. bachmannii, H. juncifolia* and the large-flowered *H. muirii*. More unusual are *H. cedarmontana, H. saldanhae* and *H. elsiae*, in which the style divides well within the perianth tube. The branches are partly emergent in *H. saldanhae* and *H. cedarmontana*, but entirely included in *H. elsiae*.

Ovary: the oblong to ovoid ovary has little taxonomic value, and apart from size there is little to distinguish species on this character.

Fruit

The fruit is a thin-walled loculicidal capsule, more or less ovoid-oblong in shape. The ovary develops rapidly after fertilization, and generally grows to reach the apex of the bracts before maturing. The bracts enclose to some extent the young fruits but in the later stages of development the bracts become dry and broken.

Among the winter rainfall area species, *Hesperantha radiata* and *H. muirii* (section *Radiata*) stand out as having particularly long slender capsules and these remain within the bracts throughout development. The capsules dehisce only near the apex due to the constraining effects of the sheathing bracts and thus may be regarded as poricidal.

Seeds are basically turbinate to globose in shape with a persistent funicle and a testa of uncontorted epidermal cells with smooth surfaces. Deviations from this basic type include increasing compression, resulting in a more or less angular to irregular shape and the wrinkling and crumpling of the epidermal cells (Wagner & Goldblatt, in prep). In the most derived type of seed, the edges develop angular wing-like structures and tails at the opposite ends. This development is most marked in section *Radiata* (but not *H. marlothii* of this section), where it is accompanied by a reduction in the size of the seeds. Similar angular and winged seeds are also found in sections *Hesperantha* (*H. spicata* and *H. cedarmontana*) and *Concentrica* (*H. fibrosa*) but in both these groups without the accompanying crumpling of the epidermal cells. In both these groups, however, the epidermal cells have distinctive roughened surfaces. Although the seeds of all the species are not yet known, and seed structure is relatively uniform, seed morphology is of some taxonomic value. It has confirmed the unity of section *Radiata* and provides support for regarding this section as the most specialised and derived in *Hesperantha*.

TAXONOMIC TREATMENT

Hesperantha Ker, Konig & Sims, Ann. Bot. **1**: 224. 1805; Baker, Flora Cap. **6**: 57. 1896; Foster, Contr. Gray Herb. **156**: 3–27. 1948.

Ixia L. sensu L.f., Suppl. Pl. 92. 1781 et Thunb., Diss. de *Ixia* 156–193. 1783. pro parte.

Plants small to medium in size. *Corm* small, asymmetric to apparently symmetric, either ovoid-globose, with or without an oblique flattened side, occasionally with down-pointing projection, or campanulate-triangular in outline (section *Hesperantha*) with a flat base, tunics hard, woody, rarely firm-membranous, either concentric, and usually light to dark brown, with outer layers completely covering inner and splitting into vertical, often elliptic sections tapering to points above and below (section *Concentrica*), or imbricate and dark to blackish, with outer layers covering inner above only, sometimes notched below into segments or margins more or less unbroken and sometimes serrate or toothed. *Cataphyll* usually single, membranous, reaching to ground level, pale-transparent (dark yellow-brown in *H. quadrangula*). *Foliage leaves* 3—several, lower basal, upper sometimes cauline, one often sheathing lower part of stem for most or rarely all its length and seemingly spathe-like (cauline sheath); cauline leaves usually shorter, becoming bract-like; leaves linear-lanceolate, rarely terete, erect or falcate, margins plane, occasionally midrib raised, or margins and midrib thickened, lamina smooth, or ribbed and minutely ciliate (*H. ciliolata*) or pilose (*H. pilosa*). *Stem* erect, usually produced above ground, or occasionally entirely below ground, terete, simple or branched, naked above base or bearing leaves below, and sheathing bracts above, smooth or pilose (*H. pilosa*). *Inflorescence* a spike, several to few-flowered, occasionally solitary flowered; *bracts* herbaceous, or membranous if concealed by leaves or leaf bases, inner bracts small, membranous, forked at apex, outer bracts with margins partly united in section *Radiata*. *Flowers* usually stellate, hypocrateriform, frequently white or pale, occasionally red, purple, blue or yellow, actinomorphic, rarely subzygomorphic, with anthers unilateral, often opening at sunset and closing at dawn, tepals subequal or inner whorl smaller, united in a tube; *tube* cylindrical, short, or fairly long, occasionally infundibuliform, either straight, or curved with flower facing downwards. *Stamens* with well-developed filaments inserted in throat of perianth tube, rarely filaments very short and within tube (*H. cedarmontana, H. saldanhae, H. elsiae*); anthers erect or often articulated and horizontal when flower fully open, usually well exserted from tube, rarely included (*H. cedarmontana, H. elsiae*), anthers pendulous in species with strongly curved perianth tubes. *Styles* slender, usually dividing at apex of perianth tube, with three very long spreading branches, rarely dividing within the tube and branches just emerging (*H. saldanhae*) or included (*H. cedarmontana, H. elsiae*). *Capsules* ovoid to cylindric, partly to entirely included in bracts during development, dehiscent fully, or only in upper half in *H. radiata; seeds* spherical to angled, many per loculus, small (0,3 mm in diameter) to large (2 mm in diameter). *Basic chromosome number* $x = 13$.

Type species: H. falcata (L.f.) Ker.

About 55 species, distributed from Ethiopia southwards along the eastern African mountain belt to the south western Cape and Namaqualand, with an outlier on Cameroun Mountain; concentrated in the western Cape and adjacent Karoo, with a secondary centre in the Drakensberg in eastern southern Africa.

KEY TO *HESPERANTHA*

1. Anthers included in perianth tube
  2. Flowers pink, horizontal .... 36. **H. elsiae**
  2′. Flowers white, upright .... 25. **H. cedarmontana**
1′. Anthers fully exserted from perianth tube
  3. Perianth tube distinctly curved, and flowers facing to the side or towards the ground
    4. Floral bracts with margins fused around the stem for at least 2 mm and up to two-thirds their length
      5. Bracts more than 18 mm long; anthers 6–10 mm long and spike 1–3-flowered .... 34. **H. muirii**
      5′. Bracts 10–18(–20) mm long; anthers 4–7(–8) mm and spike (1–)3–15-flowered
        6. Bract united round stem for ± half its length; spike (1–)6–15-flowered .... 32. **H. radiata**
        6′. Bract united round stem (or inner bract) for no more than one-third its length; spike 1–5-flowered ..... 33. **H. marlothii**
    4.′ Floral bracts with margins free, or if united round stem then for less than 1 mm
      7. Perianth tube reaching at least to apex of bracts
        8. Perianth tube 6–8 mm long; corm small, to 5 mm in diameter and lacking radiate spikes on lower margin .... 31. **H. brevifolia**
        8′. Perianth tube 10–12 mm long; corm 8–13 mm in diameter, bearing radiate spines on lower margin ..... 33. **H. marlothii**
      7′. Perianth tube usually shorter than bracts, or if longer, still emerging below apex of bracts
        9. Plants bearing a cormlet in axil of one to several stem nodes .... 23. **H. bulbifera**
        9′. Plants without axillary cormlets .... 22. **H. bachmannii**
  3′. Perianth tube straight, erect or diverging from stem
    10. Leaf pilose to microscopically ciliate
      11. Leaf and often stem pilose .... 5. **H. pilosa**
      11′. Leaf microscopically ciliate, stem smooth .... 6. **H. ciliolata**
    10′. Leaf smooth
      12. Margins of outer bract united below for at least one-third their length; leaves terete .... 35. **H. juncifolia**
      12′. Margins of outer bract not united below for any distance; leaves not terete
        13. Corm small, less than 5,5 mm in diameter and ridged vertically .... 31. **H. brevifolia**
        13′. Corm more than 5 mm in diameter or not ridged vertically
14. Corm ± symmetric and campanulate to triangular in outline with a broad flat base, and sometimes with teeth radiating from lower margin
  15. Perianth tube 15–45 mm long
    16. Flower white with dark markings at base of tepals; anthers 3–5 mm long .... 28. **H. luticola**
    16′. Flower uniformly purple (deep pink); anthers (4–)5,5–7 mm long .... 27. **H. latifolia**
  15′. Perianth tube less than 15 mm long
    17. Style dividing at apex of perianth tube and branches spreading
      18. Perianth tube 4–6 mm long; tepals 4–8 mm long ... 29. **H. spicata**

18′. Perianth tube 5–11 mm; tepals (9–)12–26 mm long
19. Flower white, cream or yellow .... 24. **H. falcata**
19′. Flower uniform pink (-red) or purple .... 26. **H. pauciflora**
17′. Style dividing well within perianth tube and branches included, or apices only emerging .... 30. **H. saldanhae**
14′. Corm globose, usually asymmetric with one side flattened and often extended downwards
20. Stem very short, usually hidden by leaf bases, or entirely underground; bracts large, herbaceous, (15–)20–30 mm long
21. Flower small, white, with tepals 8–12 mm long .... 18. **H. hantamensis**
21′. Flower pink, red or yellow; tepals 13–24 mm long
22. Basal leaves 2(–3); flower pink or red with tepals 17–25 mm long .... 16. **H. humilis**
22′. Basal leaves 2(–3); flower yellow, with tepals 13–15 mm long .... 17. **H. flava**
20′. Stem well developed, sometimes covered by a sheathing leaf below; bracts herbaceous to membranous 3–20(–22) mm long
23. Perianth tube 2–9(–11) mm long
24. Flower very small, tepals 5–6 mm long .... 10. **H. minima**
24′. Flower larger, tepals 9–35 mm
25. Flower very large, tepals 28–35 mm long .... 14. **H. vaginata**
25. Flower smaller, tepals 9–22 mm long
26. Flower white to yellow (often red to brown on reverse of outer tepals)
27. Flower yellow
28. Tepals ca. 20 mm long, anthers to 9 mm .... 15. **H. karooica**
28′. Tepals 10–17 mm long; anthers to 7 mm .... 3. **H. acuta**
27′. Flower white
29. Perianth tube very short, 2–3 mm long; cataphyll conspicuous and brownish to yellow .... 8. **H. quadrangula**
29′. Perianth tube 5–11 mm long; cataphyll seldom conspicuous, often lacking, pale and membranous, rarely brown
30. Corm (7–)9–14 mm in diameter; tunics imbricate; tepals 15–20 mm long .... 13. **H. cucullata**
30′. Corm 3–10 mm in diameter; tunics concentric; tepals 9–15(–17) mm long
31. Leaves 3 only, narrow 0,5–1,5(–2) mm wide and corm 3–6 mm in diameter .... 9. **H. flexuosa**
31′. Leaves 3–4, linear to ensiform (1–)2–5 mm wide; corm (6–)7–10 mm in diameter
32. Plants with a distinct bract leaf in upper half of stem .... 3. **H. acuta**
32′. Plants without sheathing bracts
33. Leaves linear, slightly inflated; plants of wet sites in the Calvinia district .... 7. **H. rivulicola**
33′. Leaves linear to ensiform, skin textured and flat; plants of the West Coast from Mamre to Klawer .... 1. **H. erecta**
26′. Flower pink to purple .... 11. **H. fibrosa**
23′. Perianth tube 12–35 mm long
34. Flower pure white within, often red, pink or brownish on reverse of outer tepals
35. Anther 8–12 mm long; corm 10–20 mm in diameter .... 12. **H. longituba**
35′. Anther 5–7 mm long; corm 3–8(–9) mm in diameter
36. Corm 3–5(–6) mm in diameter, narrowly ovate; tunics soft-textured .... 4. **H. montigena**

36′. Corm 6–9 mm in diameter, ovoid to globose; tunics woody
  37. Plants typically with a sheathing bract leaf in upper part of stem; perianth tube 8–11(–17) mm long ....3. **H. acuta**
  37′. Plants without a sheathing bract in upper part of stem; perianth tube 13–17 mm long .... 2. **H. namaquana**

34′. Flower pale to deep yellow or shades of red to purple
38. Filaments very short, less than 2 mm long and flower reddish-purple .... 19. **H. purpurea**
38′. Filaments longer, 2–5 mm long and flower yellow, or 8–10 mm and flower purple
  39. Flower purple; filaments 8–10 mm long 20. **H. oligantha**
  39′. Flower yellow; filaments 2–5 mm long
    40. Tepals cupped when fully open; corm ± symmetric with imbricate tunics. ....21. **H. pallescens**
    40′. Tepals extended horizontally when fully open; corm asymmetric with one side flattened below, and tunics concentric ....3. **H. acuta**

Section CONCENTRICA

1. Section **Concentrica** Goldbl., Ann. Missouri Bot. Gard. **69**: 375–376. 1982.

Corm ± symmetric to asymmetric, with one side flattened below, the flat side often extending downwards for some distance, tunics concentric, outer layers completely enclosing inner, fragmenting irregularly into unequal sections, often drawn into points above, usually brittle and woody but sometimes soft and papery. *Flower* actinomorphic, rarely zygomorphic, whitish, blue, pink or purple, occasionally yellow, often small, tube well exserted from bracts in a few species. *Leaves* pilose in *H. pilosa* or ciliate in *H. ciliolata*, margins thickened in *H. fibrosa* and occasionally in *H. pilosa* and other species.

Distribution: widespread, south western Cape to Ethiopia and Cameroun.

Species: ca. 25, 11 in the winter rainfall area.

Type species: H. pilosa (Thunb.) Ker

Section *Concentrica* is the largest and most widespread section, ranging from the south western Cape to Ethiopia and Cameroun. It has radiated extensively in the southern African Drakensberg, as well as in the south western Cape and western Karoo where some 11 species occur. An evolutionary trend is evident in the reduction in number of leaves to three, one of which partly sheaths the stem. A specialised and sometimes membranous and scale-like bract leaf is present on the stems of several species. The widespread *Hesperantha pilosa* is the only pubescent species in the genus, and the local Roggeveld endemic, *H. ciliolata,* the only one with ciliate leaves.

Unusual corm tunics occur in *H. fibrosa* in which the upper part of the tunic is drawn into very long, persistent fibres. In *H. montigena* of the south western Cape mountains, the tunics are soft and papery in texture, a condition also found in several Drakensberg species and in the tropical African *H. petitiana.* There is little floral variation in the winter rainfall area species of this section, small to moderate sized white flowers being the rule. *Hesperantha pilosa* is unusual in having populations with white, blue or purple flowers, while *H. acuta* may have either white or yellow flowers. The rare, south Namaqualand endemic, *H. namaquana,* has flowers with a longer tube than is usual for the section in the winter rainfall area.

1. **Hesperantha erecta** (Baker) Benth. ex Baker, Handbk. Irid. 150: 1892 et Flora Cap. **6**: 61. 1896; Foster, Contr. Gray Herb. **166**: 10. 1948. [comb. attrib. by Baker to Benth., Gen. Plant **3**: 703. 1882 is invalid, as basionym not indicated (Foster, 1948: 11)].

Geissorhiza erecta Baker, J. Bot. new ser. **14**: 238. 1876. Type: S. Africa, Cape, N side of Olifants R., *Drège 8468* (K, lectotype effectively designated by Foster (1948: 10); G, K, L, P, isolectotypes).

Hesperantha semipatula Foster, Contr. Gray Herb. **166**: 24. 1948. Type: S. Africa, Cape, Vogelfontein (near Graafwater), Clanwilliam distr., *Schlechter 8521* (K, holotype; B, BOL, GRA, K, L, MO, PH, PRE, S, US, Z, isotypes).

Plants (60–)120–220 mm high. *Corm* ovoid, 6–8 mm in diameter, asymmetric, with an oblique flat side, tunics concentric, dark brown, woody, outer layers fragmenting into elliptic segments, tapering at base and apex. *Cataphyll* membranous, or evidently lacking. *Leaves* usually 3(–5), linear-ensiform (1,5–)5–8 mm wide, lower 2–3 basal, upper inserted in lower part of stem, and partly sheathing. *Stem* erect, usually branching. *Spike* flexuose, (1–)3–6-flowered; *bracts* herbaceous, 8–15 mm long, inner usually slightly shorter than outer. *Flowers* infundibuliform, cream (–pale yellow) sometimes with outer tepals darker on reverse, opening about midday and closing 15h00–16h30; *perianth tube* 8–10(–11) mm long, about as long as the bracts, included or slightly exserted, *tepals* 10–15 mm long, narrowly ovoid. *Filaments* ca. 5 mm long; *anthers* (4–)5–6 mm long. Ovary ca. 3 mm, style branches slightly shorter than stamens. *Capsule* obovoid, 6–9 mm long. *Chromosome number* $2n = 26$ *(Goldblatt 4095).*

Flowering time: August–September; flowers opening about midday and closing 15h00–16h30.

Distribution: western Cape coast, recorded from Mamre in the south to the Olifants River, especially common in the Saldanha area, usually on granite outcrops. Fig. 9.

The type locality of *Hesperantha erecta, Drège 8468,* is somewhere along the north bank of the lower Olifants River between about Klawer and present-day Ebenezer (Meyer, 1843: 97 and map). Corms are lacking in all the type collections of *H. erecta* excepting a sheet at Leiden and a fragment on one of the two sheets at Kew. The available corm material is sufficient to determine that the corm is globose, and has concentric tunics. No further records of the species have been made from the area, but collections from the west coastal belt to the south seem to be conspecific. These include *Hall 3746* from Kliphoek farm near Vredendal and *Schlechter 8521* from Vogelfontein near Graafwater, the type collection of *H. semipatula.* These collections comprise plants with a globose corm having concentric tunics like that of *H. erecta,* but are more variable in both height (60–150 mm) and leaf width (1,5–6 mm wide) compared with the type material of *H. erecta* (180–220 mm high; leaves 2–3 mm wide). It seems reasonable to treat these populations as representing a single species.

The Vogelfontein and Kliphoek collections, especially the sheet of the former at Geneva, have a strong resemblance to a series of populations of a robust, white-flowered *Hesperantha* that occurs along the coast from Velddrif south to Vredenburg and the Donkergat Peninsula, always on granite outcrops. Plants of these populations differ from the type of *H. erecta* mainly in their broader leaves (to 8 mm wide) of which there may be up to five. With the inclusion of these populations in *H. erecta,* this species emerges as a fairly wide-ranging species of the Cape west coast, especially common in the Saldanha Bay area, where it grows on granite but not on the quartzitic sands also common in this area. It is regarded here as one of the most unspecialised species of *Hesperantha* found in the winter rainfall area. It is clearly a member of section *Concentrica,* but can be distinguished only negatively, by its lack of any notable characteristics, except perhaps its typically narrow, ovoid-lanceolate and acute tepals, which when fully open are slightly cupped, rather than held horizontally as in most species of *Hesperantha.*

Hesperantha erecta is unusual in that while it is self-incompatible, empty inflated fruits develop in flowers that have been selfed, or not pollinated at all. The self-incompatibility system is leaky to the extent that selfed flowers often yield 2 or 3 seeds, a small proportion of the potential seed production.

A collection from Kleinkobbis in the Bokkeveld Mountains, *Schlechter 10987*, is tentatively assigned to *H. erecta*. Specimens have larger corms with heavier tunics than usual for the species and have broadly ovoid tepals.

SOUTH AFRICA, CAPE—3118 (Vanrhynsdorp): North side of Olifants R. (-CA, -CB or -DA), *Drège 8468* (G, K, P); Kliphoek farm, rocky outcrops (-CD), *Hall 3746* (NBG); Kleinkobbis (probably -DB), *Schlechter 10987* (B, GRA, K, Z).

—3217 (Vredenburg): Rooiheuwel farm, Vredenburg-Stompneusbaai (-DD), *NBG Expedition,* 1969 (NBG *97431*); Granite rocks, Vredenburg, *Lewis 5980* (NBG); Witteklip, Vredenburg, *Lewis 1046* (SAM).
—3218 (Clanwilliam): Vogelfontein (near Graafwater) (-BA), *Schlechter 8521* (B, BOL, GRA, K, L, MO, PH, PRE, S, US, Z); 10 miles E of Velddrif, Aurora road (-CB), *Barker 10411* (NBG).
—3317 (Saldanha): Danger Bay, sandy flats near granite rocks (-BB), *Lewis 5985* (NBG, STE).
—3318 (Cape Town): Postberg, Donkergat Peninsula (-AA), *Goldblatt 4085* (K, MO); Mud River road, W of the old Mamre-Darling road (-AD), *Goldblatt 6287* (MO, NBG).

2. **Hesperantha namaquana** Goldbl., sp. nov.

Plantae 80–120 mm altae, cormo ad 9 mm in diametro, asymmetrico, tunicis concentricis, *foliis* 3(–4), inferioribus basalibus, 3–9 mm latis, *spicis* 2–5 floribus, *bracteis* (12–)15–22 mm longis, floribus hypocrateriformibus, albis vel bubalinis, rubris dorso tepalis exterioribus, *tubo perianthii* 13–17 mm longo, *tepalis* 12–17 mm longis, *filamentis* ca. 3 mm longis, *antheris* ca. 6 mm longis.

Type: S. Africa, Cape, Kareebergen 1 500 ft., *Schlechter 8304/5* (K, holotype; B. BOL, PRE, isotypes).

Plants 80–120 mm high. *Corm* ovoid, to 9 mm in diameter, asymmetric with each side flattened below, extending downwards with a conspicuous projection, tunics brown, layers evidently concentric. *Cataphyll* membranous. *Leaves* 3(–4), lower 2 basal, falcate, (30–)60–120 mm long, to 3–9 mm wide, upper 1 (or 2) inserted towards base or lower part of stem, and sheathing stem for two-thirds its length, apices free. *Stems* erect, simple or 1-branched, sheathed by leaf bases for most of its length. *Spike* 2–5-flowered; bracts (12–)15–22 mm long, inner ± equal or shorter, partly membranous. *Flower* probably hypocrateriform, white or pink, dark red on reverse of outer tepals; *perianth tube* 13–17 mm long, slender, exserted from bracts; *tepals* 12–17 mm long, ?obovate. *Filaments* ca. 3 mm long; *anthers* ca. 6 mm long. Ovary ca. 3 mm long, style branches 8–10 mm long. *Capsule* 10–15 mm long, about as long as bracts. *Chromosome number* unknown.

Flowering time: late July–mid-August.

Distribution: southern Namaqualand in the shale hills east of Bitterfontein and Nuwerus. Fig. 9.

Hesperantha namaquana is a poorly-known species of southern Namaqualand. As far as is known, it was first collected by Rudolf Schlechter in 1896 either in the Kareebergen, a low range of hills east of Bitterfontein and Nuwerus, or on the farm Kareebergen in this same area. Schlechter's collection is composed of plants at the end of their flowering season, and most sheets are now in poor condition. The specimens in BOL and K are, however, adequate to form the basis for the description. The tickets on the type collection bear two numbers, *8305* on printed labels on which "Kareebergen" has been hand-stamped, and *8304* on larger, more elaborate labels on which Kareebergen is handwritten. The specimens at B have both labels on the same sheets.

Only one other collection is known, a recent gathering by Nordenstam & Lundgren, *1443*, collected in 1974, and unfortunately also late in its flowering period. These plants, from the same general area, are more robust than the Schlechter gathering, and have broader leaves and branched stems. They resemble the Schlechter material closely, having the same long bracts, flowers with a long, exserted perianth tube, and asymmetric corms with concentric tunics and are almost certainly the same species, merely more robust due to favourable growing conditions.

Hesperantha namaquana is probably allied to *H. semipatula*, which occurs to the south, mainly along the west coast on granitic outcrops. *Hesperantha semipatula* has smaller corms with a less-pronounced downward projection, small flowers with short perianth tubes, and shorter bracts.

SOUTH AFRICA, CAPE—3018 (Kamiesberg): 10 km NE of Bitterfontein (-CD) *Nordenstam & Lundgren 1443* (MO, S).
—3118 (Van Rhynsdorp): "Kareebergen" (ca. 14 miles SE of Bitterfontein) (-AB), *Schlechter 8304/5* (B, BOL, K, PRE).

3. **Hesperantha acuta** (Licht. ex Roem. & Schult.) Ker, Irid. Gen. 91. 1827; Foster, Contr. Gray Herb. **166**: 3. 1948. **Fig. 9.**

Ixia acuta Licht. ex Roem. & Schult., Syst. Veg. **1**: 383. 1817; Type: S. Africa, Cape, foot of the Roggeveld Mts., *Lichtenstein 453* (B, holotype).

Hesperantha discolor N.E.Br., Kew Bull. **1931**: 451; Foster, Contr. Gray Herb. **166**: 9–10. 1948; Baker, Flora Cap. **6**: 64. 1896. in synon. sub *H. longituba* Baker. Type: S. Africa, Cape, Worcester, Osplaats-Tunnel Sidings, *Rogers 16740* (K, holotype and isotypes).

Hesperantha tugwelliae Foster, Contr. Gray Herb. **166**: 26. 1948. Type: S. Africa, Cape, Prince Albert, *Tugwell s.n.* (National Botanic Gardens *1151/29*) (K, holotype; BOL, isotypes).

Geissorhiza caulina Schltr. ms. (*Marloth 9728*).

Plants 100–200(–350) mm high. *Corm* narrowly ovoid to globose, generally widest in midline, and to 8 mm in diameter, asymmetric with an oblique flat base and prominent downward process, tunics concentric, light brown, outer layers fragmented somewhat irregularly into sections, often tapering above into short bristles. *Cataphyll* membranous, solitary. *Leaves* (2–)3, lin-

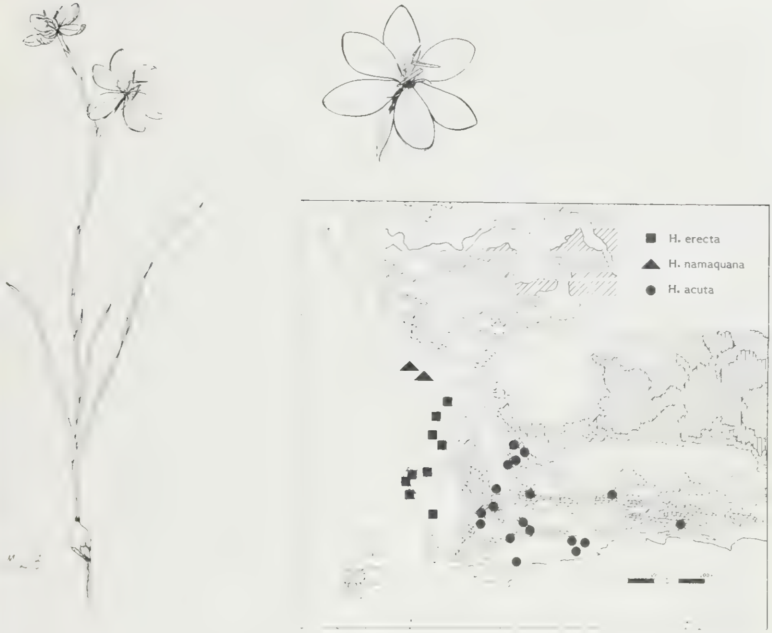


Fig. 9.
Morphology of *Hesperantha acuta* and distribution of *H. erecta, H. namaquana* and *H. acuta.* Habit × 0,5; flower life-size (voucher *Goldblatt 6373*, Ghaap Kop, Matjiesfontein

ear, short or to half as long as the stem, 2–3 mm wide, midvein evident, upper leaf sheathing lower part of stem, sometimes to base of spike, all basal or uppermost inserted above ground. *Stem* erect, often flexed above sheathing leaf, usually bearing an entirely sheathing bract in upper half. *Spike* flexuose, 2–5(–8)-flowered; *bracts* evidently herbaceous, becoming dry above, and often red-flushed, outer 8–12(–17) mm long, inner shorter. *Flower* hypocrateriform, white or pale yellow; *perianth tube* 8–11(–17) mm long, exserted from bracts; *tepals* 10–17 mm long, ovate, inner shorter and broader. *Filaments* 2–4 mm long; *anthers* 5–7 mm long, articulated. Ovary 2–3 mm long, style branches ca. 8 mm. *Capsule* ovoid, 6–10 mm long. *Chromosome number* $2n = 26$ (*Compton 20743*).

Flowering time: July-September.

Distribution: from the foot of Van Rhyns Pass in the north, in an arc through the Roggeveld Mountains to the Worcester and Robertson Karoo, and extending east in the Little Karoo, northern foothills of the Witteberg and Swartberg to the upper Longkloof, in arid situations in clay soils. Fig. 9.

My treatment of *Hesperantha acuta* differs from that of Foster (1948) in my placing *H. discolor* in the synonymy of *H. acuta*. There seems to me no significant differences between the type collections of the two species. Foster also recognised as distinct *H. tugwelliae*, which he described. The only difference between this species and *H. acuta* seems to be its yellow flower colour. *Hesperantha tugwelliae* has clear yellow flowers and *H. acuta* white, but if colour is ignored, or not known, it is impossible to distinguish the two. The type collection of *H. tugwelliae* is particularly robust, with flowers unusually large, but other yellow-flowered collections of *H. tugwelliae* have flowers well within the normal range for *H. acuta*, and there thus seems no justification for maintaining *H. tugwelliae* as a separate species.

The yellow-flowered form of *Hesperantha acuta* occurs in the eastern half of its range, in the Karoo north of the Swartberg, and in the eastern Little Karoo and upper Long Kloof.

The largest and most robust specimens of *Hesperantha acuta* have been collected in the Worcester-Robertson Karoo, and some individuals from this area may have as many as ten flowers, and leaves up to 5 mm wide. Other plants in these same collections are smaller, with narrow leaves, and match well with specimens from the more arid interior. The robust specimens are difficult to distinguish from *H. falcata* in the absence of corms, but when these are present, the ovoid, asymmetric corm of *H. acuta* with concentric tunics immediately establishes their identity.

A collection made by Burchell in 1811, between Sutherland and Fraserburg, *Burchell 1430*, probably between Seleryfontein and Klein Quaggafontein, and perhaps the *Avon-bloem* referred to in his travels (Burchell, 1822:273) is probably a slender-tubed form of *H. acuta*. It is treated as such here, where its two (or three) long and narrow basal leaves, entirely sheathing cauline leaf, and evidently yellow flowers correspond well with the Karoo form of *H. acuta* (*tugwelliae*), recorded, not far to the south near Laingsburg, and at Prince Albert. Baker (1896) referred this specimen to *H. longituba*, an essentially eastern Karoo species which normally has fairly broad leaves, and always white flowers. The specimen at Kew is annotated *H. longituba* var. *angustifolia* Foster, by Foster, but neither this name nor the citation was ever published.

Hesperantha acuta belongs in section *Concentrica* and most individuals I have examined have the slender habit of the group, as well as the characteristic corms. Within the section, *H. acuta* can be distinguished by its three (or two) produced leaves, the upper sheathing the stem for part of its length, and by a short entirely sheathing bract in the upper part of the stem. Very rarely the bract may be absent in the odd individual in a collection, but all specimens from several collections from the Tanqua Karoo-Koedoesberg area lack this bract. Too little is as yet known about the flora of this poorly collected area to evaluate the significance of this trend. Specimens lacking the stem bract are marked with an asterisk (*) below.

SOUTH AFRICA, CAPE—3119 (Calvinia): Foot of Van Rhyns Pass (-AC), *Lewis 1986* (SAM); Near Hollerivier, NW of Calvinia (-BC), *Lewis 2635* (SAM).
—3220 (Sutherland): Uitkyk farm, Sneeukrans (-AD), *Marloth 9866* (PRE), *9728* (B, PRE, STE); Roggeveld (?-A-B), *Lichtenstein 453* (B); *Houthoek (-CA), *Hanekom 477* (PRE); *Tuin Plaas, Tanqua Karoo (-CB), *Marloth 10373* (MO, PRE, STE); *Koedoesberg (-CC), *Thompson 1767* (STE); 2 km E Bizansgat farm, S trending slope, *Goldblatt 6304* (MO).
—3221 (Merweville): SW of Klein Quaggasfontein (near Fraserburg) (-A), *Burchell 1430* (K).
—3319 (Worcester): Spes Bona, Ceres Karoo (-BB), *Marloth 10357* (PRE); Hex River Valley (-BC), *Wolley Dod 4014* (BOL); Karoo Garden, Worcester (-CB), *Compton 20743* (NBG), *Van Breda 1749* (PRE), *Barker 6* (NBG), *4661* (BOL, NBG), *Stayner s.n.* (NBG *87598*); Brandvlei, *Hutchinson 133* (BOL, K, PRE); Near Breede R. bridge, Rawsonville-Worcester, *Lewis 6047* (NBG); Slopes of Rabiesberg (-DA), *Lewis s.n.* (BOL *31540*); Koo valley (-DB), *Loubser 2062* (NBG); Burger Pass, E of Koo, *Mauve & Oliver 199* (PRE, STE); Aerodrome, Robertson (-DD), *Van Breda & Joubert 1937* (PRE).
—3320 (Montagu): Matjiesfontein (-BA), *Logan s.n.* (BOL *31539*); Whitehill, *Compton 11240* (NBG), *14839* (NBG); N slope of Ghaap Kop, *Goldblatt 6373* (MO); Whitehill Ridge, *Compton 3505* (BOL, NBG); 14 miles SSE of Laingsburg (-BD), *Acocks 20513* (K, PRE); Montagu (-CC), *Williams 65* (NBG); Montagu Baths, *Page 116* (PRE); Weltevreden, Barrydale (-DC), *Batten 487* (E).
—3321 (Ladismith): 30 miles from Seven Weeks Poort on Laingsburg road (-AC), *Thomas s.n.* (NBG *93821*).
—3322 (Oudtshoorn): Prince Albert (-A), *Tugwell s.n.* (Nat. Bot. Gard. *1151/29* in BOL, K), *Marchand* sub *Marloth 10311* (B, PRE); Scholz Kloof, S slope, quartzite hills, *Marchand* sub *Marloth 11257* (PRE); Zebra road near Mt. Hope (-CC), *Moriarty 584* (NBG); Gt. Doorn R., George distr. (-D-), *Thorne s.n.* (SAM *51701*).
—3323 (Willowmore): 7,8 miles WSW of Uniondale (-DA), *Acocks 20595* (PRE); Rocky hill N of Joubertina (-DD), *Fourcade 2690* (BOL, K, STE).
—3420 (Bredasdorp): Stormsvlei–Bonnievale (-AA), *Dymond s.n.* (BOL *21239*), *Acocks 1747* (S); 2,5 miles S of Wydgelegen (-AD), *Acocks 24249* (K, PRE).
—3421 (Riversdale): Riversdale (-AB), *Rust 45* (B); Roodehoogte, near Herbertsdale (?-B), *Muir 1438* (BOL); S of Herbertsdale, Gouritz Valley scrub (-BB), *Acocks 16070* (K, PRE).

4. **Hesperantha montigena** Goldbl., sp. nov. **Fig. 10.**

Plantae 50–150(–250) mm altae, *cormo* 3–6 mm in diametro, ovato, tunicis concentricis, brunneis, papyraceis, *foliis* 3, inferioribus duobus basalibus, 2–4(–8) mm latis, *spicis* 1–3(–8) floribus, *bracteis* (9–)12–15 mm longis, *floribus* hypocrateriformibus, albis, rubris dorso tepalis exterioribus, *tubo perianthii* primo ca. 12 mm longo, denique 15 mm, *tepalis* 14–16 mm longis, *filamentis* ca. 5 mm longis, *antheris* ad 6 mm longis.

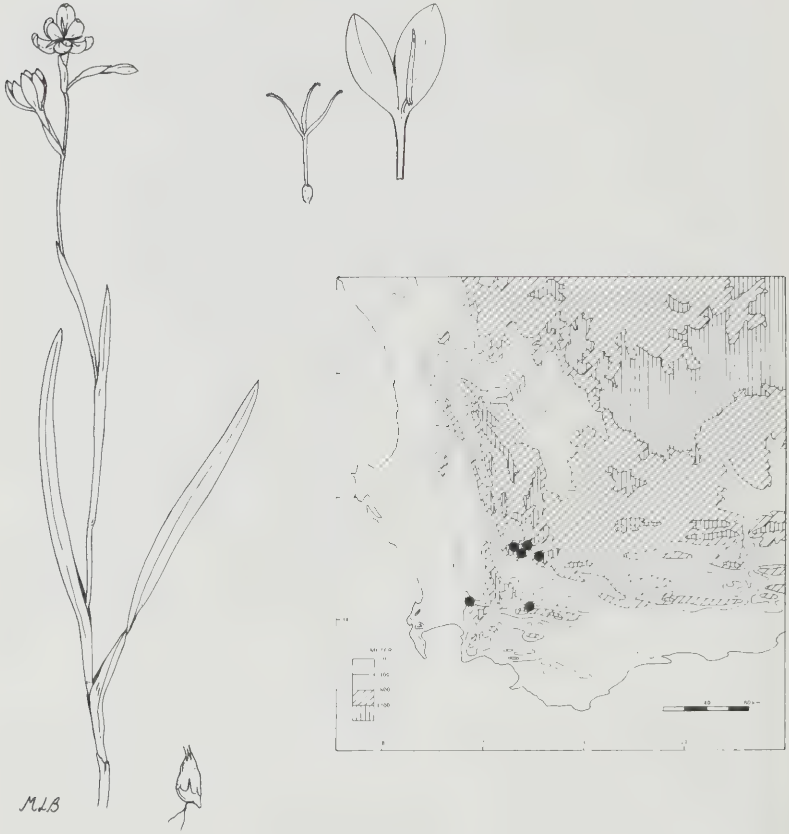


FIG. 10.
Morphology and distribution of *Hesperantha montigena*. Habit and corm life-size; partial flower and gynoecium × 2 (voucher *Esterhuysen 35307*, Mt Brodie).

Type: S. Africa, Cape, Milner Peak, Hex R. Mts., 6500 feet, *Esterhuysen 35528* (BOL, holotype; K, MO, isotypes).

Plants small to medium, 50–150(–250) mm high. *Corm* ± elliptic, 3–6 mm in diameter, with an obscure basal process directed downwards, tunics brown, papery, brittle, consisting of several concentric layers, the outer broken irregularly or notched at base and apex, sometimes even becoming fibrous. *Cataphyll* solitary, membranous. *Leaves* 3, 30–90(–200) mm long, linear to falcate, often obtuse, 2–4(–8) mm wide, lower 2 basal, often prostrate, upper inserted at base or lower part of stem and sheathing stem in lower half. *Stem* erect, unbranched, bearing a sheathing bract leaf in upper half, sometimes with short free apex. *Spike* 1–3(–8)-flowered; *bracts* (9–)12–15 mm long, herbaceous, often flushed red above, inner smaller, and slightly shorter. *Flower* hypocrateriform, white, with red on reverse of outer tepals; *perianth tube* initially ca. 12 mm, extending after anthesis to 15 mm, cylindrical; *tepals* 14–16 mm long, ovate. *Filaments* ca. 5 mm long; *anthers* to 6 mm. Ovary 3–4 mm long, style branches ca. 8 mm long. *Capsule* ovoid, to 8 mm long. *Chromosome number* $2n = 26$ (*Esterhuysen 35307, 35528*).

Flowering time: October–November.

Distribution: Hex River Mountains and Keeromsberg north of Worcester, Riviersonderend Mountains and Simonsberg, at 1 200–2 000 m (4000–6500 feet), shallow soils in damp or shady places, often in mossy banks and seeps. Fig. 10.

Hesperantha montigena is a relatively poorly known species of higher altitudes in the mountains of the interior south western Cape. It grows typically in thin soil on rock ledges or pavement, often in moss, where water accumulates in the wet season, and usually in shady south-facing situations. Its main range is in the rugged Hex River Mountains, but it extends east to Keeromsberg, and has been collected in the south in the Riviersonderend Mountains, and on Simonsberg. Further collecting in suitable habitats may well extend its range. All nine gatherings were made by Elsie Esterhuysen, the well-known Cape botanist, whose knowledge of the Cape mountain flora, where she has collected extensively, is without parallel.

The typical form is easy to recognise by its small size, few but large flowers with the outer tepals red on the reverse, and distinctive ovate to spindle-shaped corm with soft textured, concentric tunics. The concentric tunics of the corm place *Hesperantha montigena* in section *Concentrica* and it is perhaps most closely related to *H. acuta*. Without corms, *H. montigena* is easily mistaken for a dwarf form of *H. falcata* or *H. acuta*.

The collection from Brandwacht Peak, *Esterhuysen 10998*, most likely belongs here, and it is cited below, but it differs in having smaller flowers and spikes with up to four flowers. Another collection, *Esterhuysen 35307*, from Mt. Brodie consists of very robust plants, some with several flowers. This population was growing in deeper soil, which may explain the large size of these plants. There seems no reason at present to assign this collection to another species. More material is needed of *Hesperantha montigena* before its variation pattern and species limits can be adequately assessed

SOUTH AFRICA, CAPE—3318 (Cape Town): Simonsberg, 3500–4000 ft., S aspect (-DD), *Esterhuysen 35281* (BOL).
—3319 (Worcester): Milner Ridge Peak, Hex River Mts. (-AD), *Esterhuysen 9352* (BOL); Milner Peak, ledge opposite Milner Needle, 6500 ft., *Esterhuysen 35528* (BOL, K, MO); Mt. Brodie, shady gully, *Esterhuysen 35307* (K, MO, NBG, PRE); Shale band from Wit Els Kloof to Buffelshoek Peak, *Esterhuysen 26374* (BOL, MO); Waaihoek Peak (-CB), *Esterhuysen 22228* (BOL); Brandwacht Peak, 6000 ft., *Esterhuysen 10998* (BOL); Keeromsberg, Worcester Div. (-DA), *Esterhuysen 9228* (BOL); Jonaskop, Riviersonderend Mts. (-DC), *Esterhuysen 32687* (BOL).

5. **Hesperantha pilosa** (L.f.) Ker, Konig & Sims. Ann. Bot. **1**: 225. 1805; Baker, Flora Cap. **6**: 593–60. 1896. **Fig. 11.**

Ixia pilosa L.f., Suppl. Pl. 92. 1782. Type: South Africa, Cape, hills around Cape Town, *Thunberg s.n.* (Herb. Thunb. *979* UPS, lectotype here designated; S, isolectotype).

Plants (50–) 100–320 mm high. *Corm* ovoid, 5–12 mm in diameter, asymmetric, with an oblique flat side, tunics light brown, woody, initially entire, but fragmenting vertically into elliptical segments, acuminate at tips. *Cataphyll* solitary or lacking. *Leaves* 3, (30−)80–200 mm long, pilose-puberulent, sometimes pilose below only, linear, 1–10 mm wide, straight, margins and main veins sometimes slightly thickened, lower 2 leaves basal, upper basal or inserted on stem above ground, and sheathing for about half its length, monofacial distally. *Stem* erect, rarely branched, sparsely pilose or glabrous, bearing a membranous to herbaceous scale-like to leafy bract in upper third. *Spike* lightly flexuose, (1−)3–6(−12)-flowered; *bracts* entirely herbaceous or becoming membranous below, dry above, 8–14 mm long, inner narrower, and about as long as outer. *Flower* hypocrateriform, white-cream, to purple, blue, violet, or magenta-pink; *perianth tube* 6–10 (–12) mm long, slender, initially shorter than bracts, later lengthening; *tepals* subequal, 10–15 mm long, narrowly elliptical, 3–5 mm at widest. *Filaments* 2–3 mm long; *anthers* 4–6(–8) mm, articulated. Ovary 2–3 mm long, style branches 6–11 mm long. *Capsule* ovoid-oblong, 6–8 mm long. *Chromosome number* $2n = 26$ (subsp. *pilosa* only, *Goldblatt 272*; *284* as *H. puberula*; *5134*, *5810*).

Flowering time: (late July–)August–September(–late November at higher altitudes).

Distribution: south western Cape and western Karoo from Riviersonderend in the east to the Peninsula and north to Nieuwoudtville and inland from the Langberg near Kliprand, along the Hantamsberg–Roggeveld Escarpment to near Sutherland; on sand or clay, and from flats to high mountains. Fig. 11.

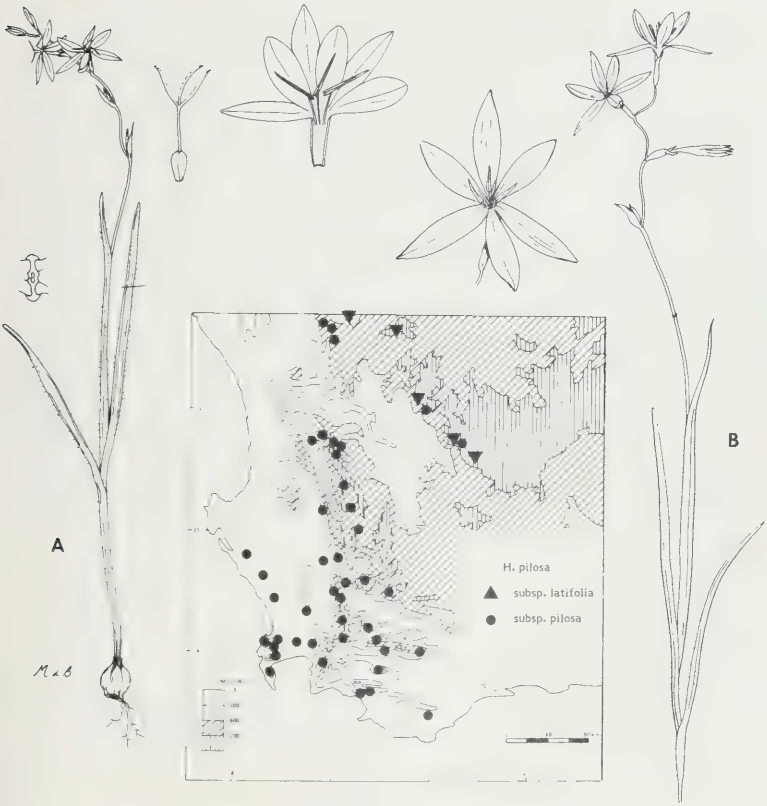


FIG. 11.
Morphology and distribution of *Hesperantha pilosa.* A: *H. pilosa* form from west of Middelpos; B: *H. pilosa* subsp. *pilosa* from Nieuwoudtville. Habits × 0,5; flowers and gynoecium life-size; leaf section much enlarged (vouchers: A: *Goldblatt 5810*, west of Middelpos; B: *Goldblatt 6262*, Nieuwoudtville).

Hesperantha pilosa is distinctive in the genus, being the only species in which pubescence is present. Leaves, and often the stems, are covered in a fairly sparse long pubescence. The closely related *H. ciliolata* has minute cilia lining vertical grooves in its leaves, but this is rather different to the hairs found in *H. pilosa*. These two species are however linked by the presence of a peculiar scale-like and usually membranous bract on the upper part of the stem, and they seem certainly to be closely allied.

Although leaves and stems are typically pilose, populations with glabrous stems are not unusual, and are scattered throughout its wide range. The flowers are usually white to cream, with a red to brown flush on the reverse of the outer tepals and are evening-blooming. Other colours have been recorded, most notably along the Nieuwoudtville escarpment, and at Sneeukrans in the Roggeveld where blue to purple-flowered and day-blooming forms have been recognised as distinct species. These are discussed in more detail under subspecies *pilosa*.

A group of populations extending along the Roggeveld escarpment north west to Calvinia, and into southern Namaqualand share several characteristics which set them apart in *Hesperantha pilosa*. These include a generally robust habit, despite the apparently extreme climate of this region, large corms, broad leaves, large flowers, and a usually large green, pilose stem bract, in contrast to the more usually membranous scale-like bracteole. A few collections from localities to the south west also occasionally have a large subherbaceous stem bract, e.g. *Schlechter 8931* from Bosch Kloof, consists of small to very large plants, a few of which have a large stem bract, and *Goldblatt 272* from Nieuwoudtville consists of one individual with a green bract and another with a membraneous bracteole. Despite the existence of such intermediate individuals, it seems that it would be useful to give formal taxonomic recognition as a subspecies to these populations with large bracts, broad leaves, and somewhat larger flowers.

KEY TO THE SUBSPECIES

1. Plants with white, blue or purple flowers, leaves 1–3(–4) mm wide; stem bracts 1–3(–10) mm long, usually membranous and glabrous . . . 2. subsp. **pilosa**
1. Plants with white-cream flowers (darker on reverse of outer tepals); leaves 4–10 mm wide; stem bracts 8–20 mm long, usually herbaceous and pilose . . . . 1. subsp. **latifolia**

1. subsp. **latifolia** Goldbl., subsp. nov.

Planta 120–320 mm alta, *cormo* 7–12 mm in diametro, *foliis* lanceolatis, 4–10 mm latis, planis, caule glabro, *bractea* herbacea 8–20 mm longa, pilosa, *spica* 1–4(–6) floribus, *floribus* albis, *tubo perianthii* 8–11 mm longo.

Type: S. Africa, Cape, Roggeveld, Sneeukrans Mt., south of Voëlfontein farm house, ca. 4500 ft., *Goldblatt 6339* (MO, holotype; K, NBG, isotypes).

Plants 120–320 mm high. *Corm* 7–12 mm in diameter. *Leaves* lanceolate, 4–10 mm wide, plane. *Stem* smooth, bearing a more or less herbaceous, pilose leaf-like bract 8–20 mm long. *Spike* 1–4(–6)-flowered. *Flowers* white, red to brownish on reverse of outer tepals; *perianth tube* 8–11 mm long.

Flowering time: September to early October.

Distribution: Roggeveld escarpment and north on the Hantamsberg and in southern Namaqualand. Fig. 11.

Subspecies *latifolia* comprises a distinct series of populations of *Hesperantha pilosa* which extend along the Roggeveld escarpment north into southern Namaqualand. It can easily be distinguished by well-developed, more or less herbaceous and pilose stem bracts, and broad leaves. Both subsp. *latifolia* and subsp. *pilosa* occur on the Roggeveld escarpment, and remain quite distinct. In this area, subsp. *pilosa* grows in large colonies in damp flat sites, while subsp. *latifolia* is scattered in stony, usually well-drained situations, either on flats or mountain slopes.

SOUTH AFRICA, CAPE—3018 (Kamiesberg): W of Langeberg towards Kliprand (-DB), *Lavranos s.n.* (PRE *58854*).
—3119 (Calvinia): Hantamsberg plateau (-BD), *Goldblatt 278* (BOL), *Goldblatt 5830* (MO); De Hoop, N end of Roggeveld escarpment (-DD), *Thompson 2533* (PRE, STE).
—3220 (Sutherland): Roggeveld, NW of Sutherland, Quaggasfontein, roadside on way to Uitkyk, 4700 ft (-AB), *Goldblatt 6349* (MO); Sneeukrans Mt. S of Voëlfontein farm house, ca. 4500 ft (-AD), *Goldblatt 6339* (K, MO, NBG).

2. subsp. **pilosa. Fig. 11.**

Hesperantha puberula Schltr. ex Foster, Contr. Gray Herb. **166**: 22. 1948. Type: S. Africa, Cape, Oorlogskloof (Nieuwoudtville), *Schlechter 10952* (B, lectotype here designated; B, BOL, G, GRA, K, PRE, US, isolectotypes).

Hesperantha bracteolata Foster, Contr. Gray Herb. **166**: 6. 1948. Type: S. Africa, Cape, Sutherland, Uitkyk farm, *Marloth 9907* (B, holotype; PRE, isotype).

Plants (50–)100–200(–300) mm high. *Corm* 4–7 mm in diameter. *Leaves* linear, 1–3(–4) mm wide, margins occasionally thickened. *Stem* pilose or smooth, with a membranous scale-like bract 1–3(–10) mm long in upper half. *Spike* (1–)2–6(–12)-flowered. *Flowers* white, blue, or purple; *perianth tube* 6–10 mm long; *tepals* 10–12(–15) mm long.

Flowering time: (late July–)August-September(–late November at high elevations).

Distribution: south western Cape north to Nieuwoudtville, and scattered along the Roggeveld escarpment edge. Fig 11.

This is the more common of the two subspecies of *Hesperantha pilosa* and it occurs in a wide variety of situations throughout the south western Cape. It is fairly variable in size, individuals ranging from only 50 mm high with one or two flowers to 300 mm with as many as 12 flowers. There is no clear pattern to this variation which seems dependent on ecological conditions rather than genetic variability. All forms have the characteristic narrow, relatively long leaves, and unusual, short membranous, scale-like bract, in the upper part of the stem. Occasionally, a robust individual may have a larger stem bract, sometimes up to 15 mm long, but this is a rare and isolated condition. Flower colour varies in subsp. *pilosa* to an unusual degree for the genus. While most populations consist of white-flowered plants which are evening-blooming, there are scattered populations of blue to purple-flowered, day-blooming plants. The most well-known of the coloured forms occurs on the Nieuwoudtville escarpment where plants with blue flowers occur from Grasberg in the north, to Lokenburg in the south.

Typical, white-flowered populations *(Goldblatt 272, 6265A)* also grow in this area and appear to differ in no significant morphological feature from the blue-flowered form which was described as a distinct species, *H. puberula*, by Foster (1948).

Another colour variant is *H. bracteolata* which Foster described from a Marloth collection from Sneeukrans in the Roggeveld, which consisted of rather dwarfed plants with purple flowers. This was recently recollected *(Goldblatt 6316)* in 1981, a year of ample rainfall, and plants were no smaller than other forms of *H. pilosa*, although they differed consistently in their dark purple flower colour. Other blue to purple colour variants have been collected at scattered sites to the south, at Dassenberg, near Darling, and in the Caledon district. There is no pattern to the distribution of the races or forms with coloured flowers, and it seems likely that mutations for coloured, day-blooming flowers have occurred repeatedly in *H. pilosa.* None of the variant colour forms has any significant morphological feature setting it apart, and it seems preferable not to recognise any of these as distinct taxa.

A collection from the Roggeveld near Blomfontein, SE of Calvinia, *Goldblatt 5810*, consists of plants which have raised and thickened leaf margins and midrib. The stem bract in this population sample ranges from membranous and scale-like to subherbaceous and almost 10 mm long. The flowers of this population are also unusual in being secund with a slightly curved perianth tube (Fig. 11A).

SOUTH AFRICA, CAPE—3119 (Calvinia): Nieuwoudtville (-AC), *L. Bolus s.n.* (BOL *21069*, SAM *52377*); Nieuwoudtville town lands, *Lavranos 10904* (MO); Groenrivier, S of Nieuwoudtville, *Goldblatt 284* (BOL); Oorlogskloof hills, *Schlechter 10952* (B, BOL, G, GRA, K, PRE, US); Oorlogskloof, hill 2 miles N of village, *Nordenstam 739* (M, S); Grasberg road, NW of Nieuwoudtville (-AC), *Goldblatt 272* (BOL), *6265A* (MO), *6262* (MO, PRE, US); Lokenburg, 2300 feet (-CA), *Acocks 17048* (PRE); 56 km SE of Calvinia on Blomfontein road (-DD), *Goldblatt 5810* (K, MO, NBG, PRE, S, US).

—3218 (Clanwilliam): Near Clanwilliam Dam (-BB), *Lewis & Davis 2495* (SAM); Bosch Kloof, *Schlechter 8931* (B, G, K, L, MO, P, PH, PRE, S, US, Z).
—3219 (Wuppertal): Uitkyk Pass, Cedarberg (-AC), *Lewis s.n.* (BOL *22269*), *Barker 261* (NBG); Shale band, E slopes of Sneeuberg, *Esterhuysen 13092* (BOL); Middelberg vlakte, *Goldblatt 5134* (B, MO, US); Elands Kloof (-CA), *Barker 3798* (NBG), *Compton 16239* (NBG); Duiwelsgat slopes, S Cedarberg, *Esterhuysen 13141* (BOL); Wabooms Rivier, Cold Bokkeveld (-CC), *Lewis 2508* (SAM); Near De Keur, *Lewis 1402* (PRE, SAM).
—3220 (Sutherland): Farm Uitkyk, Sneeukrans, top of cliffs (-AD), *Marloth 9907* (B, PRE, STE); Voëlfontein farm, NW of Sutherland, *Goldblatt 6310* (K, MO, NBG).
—3318 (Cape Town): Hills round Darling (-AD), *H. Bolus s.n.* (BOL *12838*); Mamre hills, *Compton 14964* (NBG); Groenekloof, *Drège s.n.* (K); Lucasfontein near Oupos Hotel (-BA), *Acocks 24314* (MO, PRE); Porterville (-BB), *Loubser 458* (NBG); Malmesbury (-BC), *Barker 2547* (NBG); Slopes of Lion's Head (-CD), *Drège s.n.* (SAM), *Barker 3867* (NBG); Near Kenilworth, *H. Bolus s.n.* (BOL *8026*); Rosebank, *H. Bolus s.n.* (BOL *3767*, K, PRE), *Schlechter 1038* (B, BOL, G, GRA, Z); Foot of Table Mt., *Pappe s.n.* (S); Cairn Ravine, Table Mt., *Esterhuysen 9017* (BOL); Devil's Peak, *Wolley Dod 585* (BOL, K), *Wilms 3700* (WU, Z), *Tyson 2480* (GRA, NBG, PRE); Table Mt., *Drège 1550* (B), *Ecklon 399* (B, G, K, MO, PRE, S, Z); S end of Dassenberg (-DA), *Pillans 6860* (BOL); Paarl, 6,4 miles WNW of Windmill (-DB), *Acocks 24407* (PRE); Langverwacht, Kuils River (-DC), *Oliver 4654* (STE); Stellenbosch flats (-DD), *Garside 83* (K).
—3319 (Worcester): Tulbagh (-AC), *L. Bolus s.n.* (STE); Wet flats, Romans River Nature Reserve, *Goldblatt 6288* (MO, WAG); Gouda (Piketberg Road), *Schlechter 4850* (B, G, K, P, PRE, Z); N facing slopes of Hex R. Mts. above Ezelsfontein on plain above marsh on Milner Vlakte (-AD), *Esterhuysen 35530* (BOL, MO, PRE, S, US, WAG); Baviaans Kloof, Wellington (-CA), *Leighton 2160* (BOL); Wellington, *Cummings s.n.* (GRA); French Hoek Pass, 2200 ft (-CC), *Barker 4142* (NBG); Wemmershoek Mts., *Esterhuysen 9061* (BOL); Keeromsberg, 3000–4000 ft (-DA), *Esterhuysen 9229* (BOL).
—3418 (Simonstown): Near Bergvliet (-AB), *Salter 7645* (SAM); Firgrove hill, Bergvliet farm, *Purcell s.n.* (MO, SAM *93334*); Flats near Constantia, *Krauss 1391* (MO); Near Simonstown, *Schlechter 1089* (B, GRA, Z); Oatlands, *Wolley Dod 2978* (K); Sir Lowry's Pass (-BB), *Schlechter 1129* (B, Z).
—3419 (Caledon): Flats E of Viljoens Pass (-AA), *Davis s.n.* (SAM); Caledon Zwartberg (-AB), *Ecklon & Zeyher s.n.* (P, Z); Fern Kloof Nature Reserve, Hermanus (-AC), *Robertson 470* (MO); Hermanus, hillside above Mossel R. (-AD), *Compton 23643* (NBG); 2 miles E of Hermanus, *Gillett 4466* (BOL); Foot of Riviersonderend Mts. (-B), *Stokoe 8941* (BOL, SAM); Genadendal (-BA), *Prior s.n.* (K), *Verreaux 1831* (G); Flats at Mierkraal, S of Bredasdorp (-DB), *Goldblatt 6182* (MO).

Without precise locality: *Thunberg s.n.* (S, UPS); Caledon Zwartberg und Umgegend des Bades, *Ecklon & Zeyher 235* (B, G, K, LD), *51.8* (C, GH, UPS); *Drège s.n.* (G, P, Z); *Roxburgh s.n.* (G); *Verreaux 1831* (G); *Krauss 1841* (G).

6. **Hesperantha ciliolata** Goldbl., sp. nov.

Planta 150–300 mm alta, *cormis* ignotis, *foliis* 3, basalis, linearibus, 2–3 mm latis, costatis, ciliolatis, caule membranacea bractea in parte superiore, *spicis* 5–7 floribus, *bracteis* 10–13 mm longis, membranaceis, *floribus* stellatis violaceis, *tubo perianthii* 3–4 mm longo, *tepalis* 12–14 mm longis, *filamentis* ca. 2 mm longis, *antheris* 6–7,5 mm longis.

Type: S. Africa, Cape, Geelhoek, Sutherland distr., *Acocks 17176* (PRE, holotype).

Plants 150–300 mm high. *Corm* unknown. *Cataphyll* solitary, membranous. *Leaves* 3, all basal, linear, erect to slightly outcurving, with 4–5 longitudinal grooves, alternating with ribs, and lined with cilia, uppermost leaf sheathing stem for ca. two-thirds of its length, with produced apex. *Stem* erect, flexed below inflorescence, unbranched, bearing a membranous, transparent, sometimes scale-like stem bract 3–10 mm long, above or at apex of leaf sheath. *Spike* 5–7-flowered; *bracts* evidently dry and membranous, 10–13 mm long, inner narrower and slightly shorter than outer. *Flower* violet, stellate; *perianth tube* 3–4 mm long, cylindric, included in bracts; *tepals* subequal, 12–14 mm long, obovate, ca. 5 mm wide. *Filaments* ca. 2 mm long, inserted at top of tube; *anthers* 6–7,5 mm long. Ovary ca. 2 mm long, style branches 7–8 mm long. *Capsule* and seeds unknown. *Chromosome number* unknown.

Flowering time: mid-September–October.

Distribution: Roggeveld escarpment, Sutherland district, sandy flat places, known only from Geelhoek. Fig. 12.

Hesperantha ciliolata is known only from a single collection, which in fact lacks a corm. Other features, especially the membranous and scale-like stem bract are reminiscent of *H. pilosa*, and it seems likely that it belongs in section *Concentrica*, close to *H. pilosa*. These two species are the only two in the genus in which pubescence of any sort is developed. *H. pilosa* has rather sparse, long hairs, while *H. ciliolata* has very small cilia which line the grooves that run the length of the leaves.

SOUTH AFRICA, CAPE—3220 (Sutherland); Geelhoek, sandy flats in Mountain Renosterveld (-BC), *Acocks 17176* (PRE).

7. **Hesperantha rivulicola** Goldbl., sp. nov. **Fig. 12.**

Plantae 150–300 mm altae, *cormo* 7–10 mm in diametro, globoso, tunicis concentricis, *foliis* 3–4, basalis vel superioribus supra terram insertis, ad 2 mm latis, *spicis* 2–5 floribus, *bracteis* 9–12 mm longis, *floribus* stellatis albis, brunneis dorso tepalis exterioribus, *tubo perianthii* 7–10 mm longo, *tepalis* ad 15 mm longis, *filamentis* 3 mm longis, *antheris* ca. 6 mm longis.

Type: S. Africa, Cape, streambeds below the Hantamsberg at Calvinia, *Goldblatt 5807* (MO, holotype; B, BOL, E, K, NBG, PRE, S, US, WAG, isotypes).

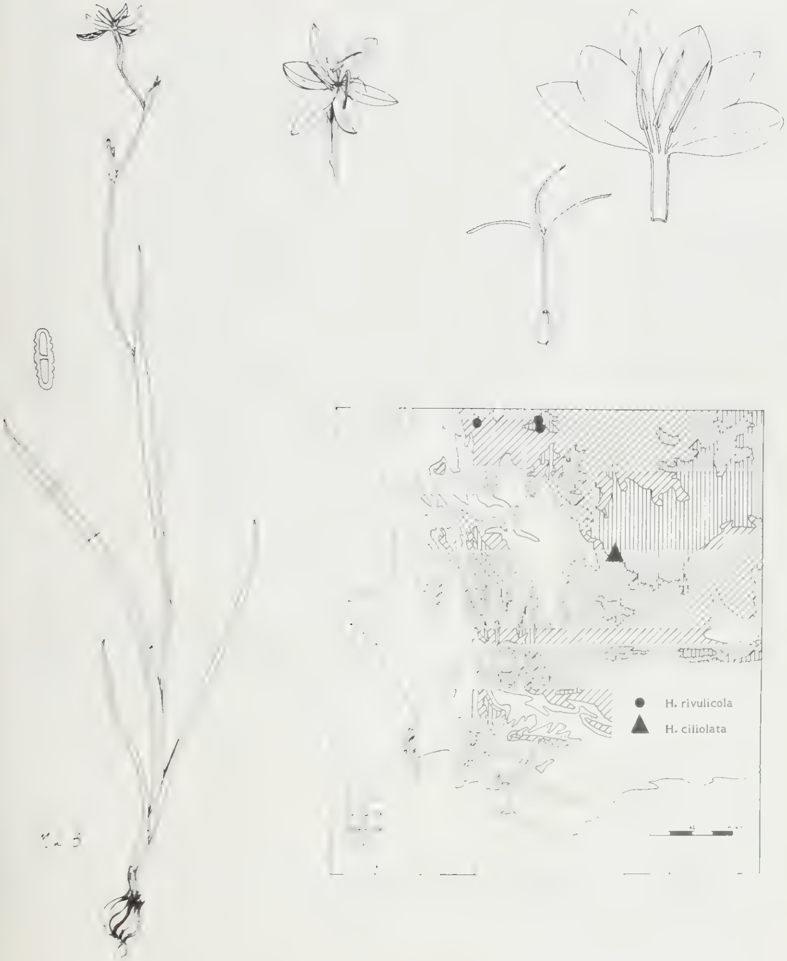


FIG. 12.
Morphology of *Hesperantha rivulicola* and distribution of *H. rivulicola* and *H. ciliolata*. Habit × 0,5; flower life-size; opened flower and gynoecium × 2 (voucher *Goldblatt 5807*, Hantamsberg flats).

Plants 150–300 mm high. *Corm* globose, 7–10 mm in diameter, tunics brown, concentric, inner layer unbroken, outer fracturing vertically into elliptic segments tapering to points at tips. *Cataphyll* solitary, membranous. *Leaves* 3–4 inner, straight, reaching to midpoint of stems or to inflorescence, to 2 mm wide, pale green, slightly inflated, all basal, or upper inserted on stem shortly above ground, uppermost sheathing lower half of stem, with free apex. *Stem* solitary, or 2–3-branched, main axis dividing at base of leaf sheath, erect. *Spike* flexuose, 2–5-flowered; *bracts* 9–12 mm long, green below, becoming dry above, inner as long, but narrower than outer. *Flower* white, stellate, opening at sunset, and then sweet-scented, outer tepals brownish on reverse, with a dark central line; *perianth tube* straight, cylindric, 7–10 mm long; *tepals* subequal, outer lanceolate, to 15 mm long, 4,5 mm wide, inner elliptic, to 14 mm long and 5 mm wide. *Filaments* 3 mm long; *anthers* ca. 6 mm long, articulated and horizontal. Ovary ca. 2 mm long, style branches ca. 8 mm long, spreading. *Capsule* unknown. *Chromosome number* $2n = 26$ *(Goldblatt 5807)*.

Flowering time: September

Distribution: local in wet sand in the courses of seasonal streams near Nieuwoudtville and Calvinia. Fig. 12.

Hesperantha rivulicola is known from only a few collections in the Nieuwoudtville–Calvinia area of the north western Cape. It is apparently restricted to seasonal seeps and streams and grows in or near running water. The general appearance of the plant is much like that of a slender *H. falcata* or *H. acuta* and it has the unspecialised white flowers characteristic of these species. The corms are, however, small and of the concentric type while the leaves are distinctive in being pale green, linear, and slightly inflated. The spike is generally rather few-flowered. The flowers open at sunset and close again at first light.

SOUTH AFRICA, CAPE—3119 (Calvinia): In stream at Van Wyk's farm, Nieuwoudtville (-AC), *L. Bolus s.n.* (BOL *21065*, K, NBG, PRE, SAM); Stream beds below Hantamsberg, Calvinia (-BC), *Goldblatt 5807* (B, BOL, E, K, MO, NBG, PRE, S, US, WAG); Akkerendam, Calvinia, in water, *Acocks 18497* (K, PRE), *Leistner 354* (PRE).

8. **Hesperantha quadrangula** Goldbl., sp. nov.

Plantae 100–300 mm altae, *cormo* 6–8 mm in diametro, globoso, tunicis ± concentricis, cataphyllis atrobrunneis, *foliis* 3, basalibus duobus interioribus, 3–7 mm latis obtusis, superiore quadrangulo in sectione vaginante, *spicis* 1–8 floribus, *bracteis* 7–9 mm longis, membranaceis supra, *floribus* stellatis, albis, carneis dorso tepalis exterioribus, *tubo perianthii* 2–3 mm longo, *tepalis* 9–12 mm longis, *filamentis* ca. 3 mm longis, *antheris* 3–4 mm longis.

Type: S. Africa, Cape, Hantamsberg at Calvinia, below plateau cliffs, *Goldblatt 5795* (MO, holotype).

Plants 100–300 mm high. *Corm* globose, 6–8 mm in diameter, tunics brown, concentric, notched below and above, and breaking into irregular sections. *Cataphyll* single, dark brown, brittle-membranous. *Leaves* 3, all basal, lower two 30–80(–100) mm long, diverging, relatively broad, 3–7 mm wide, obtuse, uppermost sheathing lower half two-thirds of stem, quadrangular in section when live, with short free apex ca. 10 mm long. *Stem* erect, simple, without bracts. *Spike* 1–7-flowered; *bracts* herbaceous below, membranous above, 7–9 mm long, inner narrower than outer. *Flower* white, stellate, outer tepals suffused with pink on reverse; *perianth tube* 2–3 mm long, included in bracts; *tepals* 9–12 mm long, narrowly obovate. *Filaments* ca. 3 mm long; *anthers* 3–4 mm long. Ovary to 4 mm long; style branches to 5 mm long. *Capsule* and seed not known. *Chromosome number* unknown.

Flowering time: September.

Distribution: heavy clay soil in stony ground on the plateau and upper slopes of the Hantamsberg, above Calvinia. Fig. 13.

Hesperantha quadrangula has been collected only on the slopes and summit plateau of the Hantamsberg at Calvinia, and is, so far, known from just two gatherings. The plants vary considerably in size, from 100 to 300 mm high, and have between one and eight flowers. The species has small globose corms with dark, rather irregularly broken tunics, apparently of the concentric type, and it is referred to section *Concentrica*. Its affinities are obscure, but it may be related to *H. acuta*, a Roggeveld species with large flowers. *Hesperantha quadrangula* can be recognised immediately by its dark brown cataphyll, two broad, obtuse basal leaves, and a third, almost entirely sheathing leaf which is quadrangular in section. Its flowers are comparatively small for the genus, with tepals 9–12 mm long, and have an unusually short perianth tube only 2–3 mm long, and enclosed in the bracts.

SOUTH AFRICA, CAPE—3119 (Calvinia): Western end of Hantamsberg at Calvinia, below plateau cliffs, S aspect (-BC), *Goldblatt 5795* (MO); Hantamsberg plateau, southwestern end, *Goldblatt 5830A* (MO).

9. **Hesperantha flexuosa** Klatt, Abh. nat. Ges. Halle **15**: 394 (Ergänz. 60). 1882; Baker, Flora Cap. **6**: 59. 1896; Foster, Contr. Gray. Herb. **6**. 166: 13. 1948. Type: S. Africa, Cape, Namaqualand, Elboogfontein, *Drège 2639* (B, "Herb. Lübeck" holotype; G, isotype). **Fig. 13.**

Hesperantha namaquensis Baker, Handbk. Irid. 149: 1892. Type: S. Africa, Cape, Namaqualand, *Scully 50* (K, holotype).

Hesperantha bolusii, Foster, Contr. Gray Herb. **166**: 6. 1948. Type: S. Africa, Cape, Namaqualand, Nababeep, *Bolus s.n.* in Herb. Norm. Aust. Afr. *694* (G, holotype; B, BOL, G, K, PRE, SAM, UPS, isotypes).

Hesperantha albiflora Schltr. ms., Brakdam, Namaqualand, *Schlechter 11125*.

Plants (60–)100–200 mm high. *Corm* ovoid, asymmetric, to 3–6 mm in diameter, tunics dark brown, woody, outer layers fragmenting vertically, often into elliptic segments tapering at base and apex, base with a well-developed lateral process. *Cataphyll* membranous, evidently solitary. *Leaves* usually 3, lower 2 basal, linear-filiform, 0,5–1,5 mm wide, erect to falcate, third leaf basal or inserted above ground, sheathing for half its length. *Stem* erect, simple, rarely with a single branch from cauline node, often flexed above leaf sheath. *Spike* flexuose, 4–7-flowered; *bracts* evidently membranous, dry in upper half, 7–10 mm long, inner usually slightly shorter. *Flower* hypocrateriform, white, sweet-scented, outer tepals sometimes darker on re-

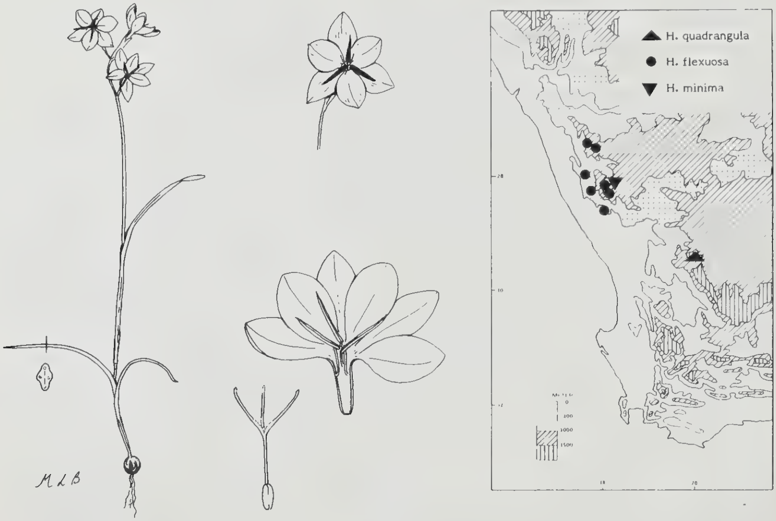


FIG. 13.
Morphology of *Hesperantha flexuosa* and distribution of *H. flexuosa, H. quadrangula* and *H. minima.* Habit × 0,5; flower life-size; gynoecium and opened flower × 2 (voucher *Goldblatt 5763*, Kamiesberg).

verse; *perianth tube* 5–9(–10) mm long, ovoid, to 5 mm wide; *tepals* 8–13 mm long, 3,5–5 mm wide. *Filaments* ca. 3 mm long; *anthers* 4,5–6 mm long. Ovary 2–3 mm; style branches usually slightly shorter than stamens. *Capsule* ovoid, 5–6 mm long. *Chromosome number* $2n = 26$ *(Goldblatt 191).*

Flowering time: August–September(–October at higher altitudes).

Distribution: fairly common in Namaqualand in granite-derived sand, usually in wetter sites. Fig. 13.

This typically dwarf, slender species is endemic to the Kamiesberg and northern Namaqualand. It grows on the coarse grained granitic sand of the area, often in damper situations such as washes or south-trending slopes. The species appears to be common, but is very inconspicuous because of its small size, and because the flowers only open in the evening. The very slender, linear leaves are characteristic, with the two lower being basal, and the third usually inserted above ground level. The thin stem is typically flexed above the sheathing part of the upper leaf, and always lacks a cauline bract.

Hesperantha flexuosa is related, on the one hand, to the dwarf, small-flowered Kamiesberg endemic, *H. minima*, and to *H. erecta* on the other. *Hesperantha erecta* is native to the Cape west coast, south of the Olifants River, and is usually a robust, several-branched and broad-leafed species. Depauperate plants, however, resemble *H. flexuosa* closely, and may be difficult to separate.

SOUTH AFRICA, CAPE—2917 (Springbok): Near Nababeep (-DB), *H. Bolus* in Herb. Norm. Aust. Afr. *694* (B, BOL, G, K, PRE, SAM); Granite hill west of Springbok, *Goldblatt 532* (BOL); Near van der Stel's mine, east of Springbok, *Goldblatt 191* (BOL); Wildeperdehoek Pass, S facing slopes, *Goldblatt 5755* (K, MO, S).
—3017 (Hondeklipbaai): Grootvlei (-BB), *Barker 3717* (NBG), *Lewis 1382* (SAM), *Leighton 1230* (BOL); Noheep, farm Arakoop, *Thompson & LeRoux 43* (K, PRE, STE); Elboogfontein, *Drège 2639* (B, G, tracing S); Brakdam hills (-BD), *Schlechter 11125* (B, BOL, G, GRA, K, L, MO, P, PH, PRE, S, US).
—3018 (Kamiesberg): Top of Kamiesberg Pass (-AA), *Goldblatt 5763* (MO, PRE, S); Foot of Wilgehout ravine (-AC), *Pearson 6733* (BOL, K); De Kom (farm Karas) 3 miles from Leliefontein, *Leipoldt 3587* (BOL); Sneeukop, *Pearson s.n.* (L).

Without precise locality: Little Namaqualand, *Scully 50* (K); Namaqualand, *Wyley s.n.* (K); Garies–Okiep, *Marloth 6743* (PRE, STE).

10. **Hesperantha minima** (Baker) R.C. Foster, Contr. Gray Herb. **135**: 77. 1941 et Contr. Gray Herb. **166**: 20. 1948.

Geissorhiza minima Baker, J. Bot. **14**: 239. 1876 et Flora Cap. **6**: 75. 1896. Type: South Africa, Cape Kamiesberg, "Modderfonteinsberg" mountains near Modderfontein, *Drège 2632* (K, lectotype designated by Foster; B, G, K, L, MO, P, S, isolectotypes).

Plants small, 40–50 mm high. *Corm* small, ovoid, tunics unknown. *Cataphyll* membranous, apparently solitary. *Leaves* 3, linear, falcate, less than 1 mm wide, 20–30 mm long, lower 2 basal, upper basal or inserted shortly above ground, and sheathing lower part of stem. *Stem* erect, sheathed below by upper leaf, simple or 1-branched. *Spike* 1–3-flowered; *bracts* 3–5 mm long, herbaceous below, membranous and dry above, and red-flushed, inner slightly smaller. *Flower* small, evidently hypocrateriform, white, with darker colour on reverse of outer tepals; *perianth tube* 4–5 mm long, well exserted from bracts; *tepals* 5–6 mm long, ovoid. *Filaments* ca. 1 mm long; *anthers* 2–3 mm long. Ovary 1–1,5 mm long, style branches ca. 3 mm long. *Capsule* unknown. *Chromosome number* unknown.

Flowering time: October–early November.

Distribution: “Modderfonteinsberg”, 1 200–1 500 m (4000–5000 feet), Kamiesberg. Fig. 13.

This tiny species, known only from the type gathering made by Drège in 1839 in the Kamiesberg, is probably a high altitude endemic of extremely limited distribution. It appears related to *Hesperantha flexuosa* which has a wide distribution in Namaqualand but corms are not known and its correct relationships thus remain uncertain. The flowers are among the smallest in the genus, but they are otherwise unremarkable.

SOUTH AFRICA, CAPE—3018 (Kamiesberg): Modderfonteinsberg, Kamiesberg (-AC), *Drège 2632* (B, G, K, L, MO, P, S).

11. **Hesperantha fibrosa** Baker, Handbk Irid. 149. 1982, et Flora Cap. **6**: 61. 1896; Foster, Contr. Gray Herb. **166**: 11. 1948. Type: S. Africa, Cape, Kleinriviersberg, *Zeyher 3960* (K, lectotype here designated; B, G, K, S, SAM, W, Z, isolectotypes). **Fig. 14.**

Plants 80–300 mm high. *Corm* ovoid, 8–12 mm in diameter, asymmetric, with an oblique flat side, tunics dark brown, concentric, outer layers fragmenting into vertical segments, drawn into long fibres above. *Cataphyll* solitary, membranous, brown when dry. *Leaves* 3 (or third bract-like), lower 2 basal, 40–100 mm long, ensiform, sometimes succulent or more usually margins and midrib thickened, 2–4 mm wide, upper inserted on stem above the ground, and sheathing stem for most of its length. *Stem* erect, unbranched. *Spike* flexuous, (1–)3–6-flowered; *bracts* 9–14 mm long, herbaceous, inner ± as long as outer, narrower. *Flower* hypocrateriform, pink to violet-purple; *perianth tube* 7–10 mm long, barely emerging from bracts; *tepals* spreading, ca. 10 mm long, ovoid, spreading. *Filaments* 3–4 mm long; *anthers* ca. 4 mm long. Ovary ca. 2 mm, style branches 6 mm long. *Capsule* oblong, 6–8 mm long. *Chromosome number* $2n = 26$ *(Goldblatt 6199).*

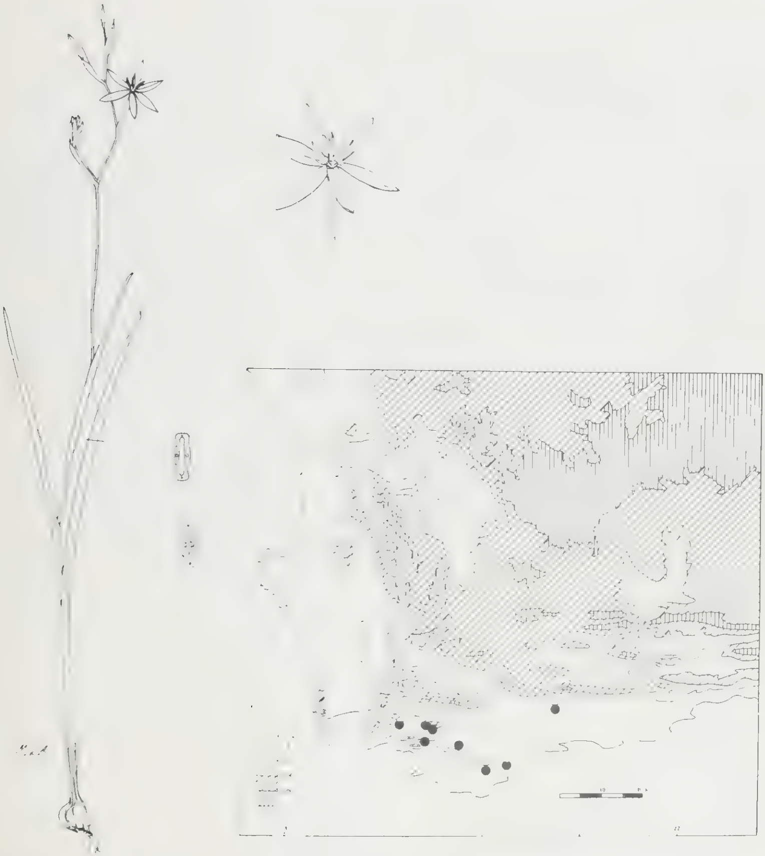


FIG. 14.
Morphology and distribution of *Hesperantha fibrosa*. Habit × 0,5; flower life-size; leaf sections × 2 (voucher *Goldblatt 6101*, Mierkraal, including upper leaf section; lower leaf section *Goldblatt 6199*, Caledon).

Flowering time: July–August (–early October).

Distribution: southern Cape, from Houw Hoek in the west, to Heidelberg in the east (a record from Elands Kloof, Clanwilliam Division is doubtful). Fig. 14.

Hesperantha fibrosa is rather poorly collected, and if the record correctly reflects the situation, it is rare, although distributed over a fairly wide area. It is apparently a species of lower mountain slopes or flats and it grows either in stony or sandy soil. It is possible that the paucity of collections is partly due to infrequent flowering which may occur well only after veld fires.

At first glance this species appears to be a member of the *Hesperantha falcata* complex, but the corms are typical of section *Concentrica*. The brown corms are distinctive in the way that they fragment into elliptical segments with the upper ends produced into long stiff fibres, a character unique in this section. The leaf of *H. fibrosa* is also unusual in having thickened margins and midrib, this very pronounced in some populations, but little in others such as *Smith 2978* (Nachtwacht) and *Acocks 24037* (WNW of Heidelberg). The latter collection has been assigned to *H. fibrosa* with some hesitation. The leaf number and arrangement, inflorescence, habit, and flower colour match *H. fibrosa* well, but the characteristic long stiff fibres of the corm tunics are not developed.

SOUTH AFRICA, CAPE—3419 (Caledon): Near Houwhoek (-AA), *H. Bolus s.n.* (BOL *22709*); N slope of Kleinrivier Mts. between Major Shaw and Tesselaars (-AD), *Zeyher 3960* (B, G, K, S, SAM, W, Z); Swartberg, Caledon and near the Baths (-AB), *Ecklon & Zeyher Irid. 239* (B, G. LD, P, S, SAM); Clay flats S of Caledon, *Goldblatt 5899* (MO), *6199* (MO, NBG); Caledon–Napier (-BC), *Esterhuysen 3055* (BOL); Clay flats, Mierkraal farm SW of Bredasdorp (-DB), *Goldblatt 6101* (K, MO, NBG, PRE, S), *6181* (MO).
—3420 (Bredasdorp): Hills 8 miles WNW of Heidelberg (-BB), *Acocks 24037* (K, PRE); Farm Nachtwacht, Rietheuwels, Bredasdorp distr. (-CA), *Smith 2978* (BOL, PRE).

Doubtful locality:—3219 (Wuppertal): Elands Kloof (-CA), *Esterhuysen 3160* (BOL).

Section IMBRICATA

2. Section **Imbricata** Goldbl., Ann. Missouri Bot. Gard. **69**: 376. 1982.

Corm ± asymmetric, with one side flattened, and sometimes extending downwards for a short distance, tunics imbricate, outer layers overlapping inner above only, usually fragmenting regularly below into even-sized sections, sometimes drawn into points above, usually very woody in texture. *Flower* actinomorphic, white, pink, purple, yellow, sometimes with dark contrasting markings, small to large, tube well exserted from bracts in several species, perianth tube curved in *H. bachmannii* and *H. bulbifera*. Plants caulescent or acaulescent, and then with large bracts.

Distribution: centred in western southern Africa, mainly in arid areas; Namaqualand to Transvaal.

Species: 12, all found within the winter rainfall area.

Type species: *H. humilis* Baker

Section *Imbricata,* comprising some 12 species is centred in the western Karoo, but in fact extends from northern Namaqualand through the Karoo to the Transvaal. An acaulescent habit is developed in three species, *H. humilis* and *H. hantamensis* of the western Karoo, and *H. flava* which is known from northern Namaqualand and the Laingsburg district of the Karoo. Two species have a curved perianth tube, the widespread *H. bachmannii* and *H. bulbifera,* which occurs in the eastern Cape and at isolated montane sites in the Transvaal. Local endemics include the long-tubed *H. pallescens* from the western Cape, and *H. oligantha, H. karooica,* and *H. purpurea,* all from the Calvinia district of the western Karoo. The most striking species is *H. vaginata,* the common form of which has large, deep yellow flowers with contrasting dark brown markings.

12. **Hesperantha longituba** (Klatt) Baker, Gard. Chron. **7**: 652. 1877; Flora Cap. **6**: 64. 1896; Foster, Contr. Gray. Herb. **166**: 19. 1948 pro parte excl. syn. *Acidanthera huttonii.*

Geissorhiza longituba Klatt, Linnaea **35**: 383. 1867/8. Types: S. Africa, Cape, Somerset East, *Bowker s.n.* ("Sommasch, Bourker") [K, lectotype here designated (K, S, isolectotypes)]; Orange Free State, *Cooper 746* (K, syntype; E, G, K, PRE, Z).

Hesperantha candida Baker, Handbook Irid. 151: 1892 et Flora Cap. **6**: 62–63. 1896. Type: S. Africa, Orange Free State, *Cooper 746* (K, lectotype here designated; E, G, K, PRE, Z, isolectotypes) (specimen at E may be a different species).

Hesperantha candida var. *bicolor* Baker, Flora Cap. **6**: 63. 1896. Type: S. Africa, Cape, Boschberg, Somerset East, 4000 feet, *MacOwan s.n.* in Herb. Norm. Aust. Afr. *61* (K, lectotype effectively designated by Foster (1948: 5); BOL, G, GRA, M, US, WU, Z, isolectotypes).

Hesperantha bicolor (Baker) Foster, Contr. Gray Herb. **166**: 5. 1948.

Plants (60–)150–300 mm high. *Corm* 10–18 mm in diameter, ovoid, tunics dark, layers imbricate, notched below into segments. *Cataphyll* membranous, apparently solitary. *Leaves* 3–4, lower basal, uppermost basal or inserted shortly above ground and sheathing lower part of stem, often dry or broken above, margins hyaline, usually slightly raised, (3–)5–9 mm wide *Stem* erect, simple or rarely bearing a branch from the base, sometimes with a sheathing bract in upper half. *Spike* lightly flexuose, (1–)2–6-flowered; *bracts* (12–)15–20(–30) mm long, herbaceous, with hyaline margin, inner bract shorter, membranous. *Flower* hypocrateriform, white, often pink to brownish on reverse of outer tepals, opening in evening, sweet-scented;

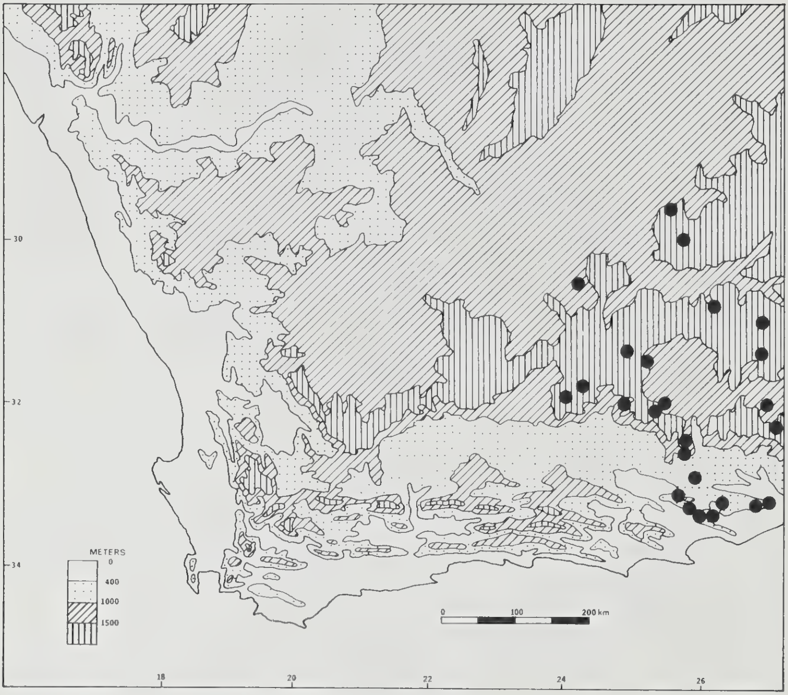


FIG. 15.
Distribution of *Hesperantha longituba.*

perianth tube (10–)12–18 mm long, slightly to well exserted from bracts, straight, cylindrical; *tepals* (15–)20–22 mm long, 8–10 mm wide, ovoid, inner shorter and broader than outer. *Filaments* 5–8 mm long; *anthers* 8–12 mm long, articulated. Ovary 4–5 mm long, style branches to 12–16 mm long. *Capsule* ca. 8 mm long, ovoid. *Chromosome number* unknown.

Flowering time: (mid July–)August–September.

Distribution: higher elevations in the southern and eastern Karoo, extending into the eastern Cape and south western Orange Free State. Fig. 15.

Hesperantha longituba has its centre of distribution in the eastern Karoo mountains around Cradock, Graaff-Reinet, Somerset East and Middelburg, and it is from this area that the most robust specimens have been collected. The lectotype collection from Somerset East (*Bowker s.n.*), consists of plants up to 300 mm tall, with large flowers and a perianth tube 15–18 mm long. The type collection of *H. candida* var. *bicolor* is from the same area and is clearly conspecific.

Plants from further north and north east towards Queenstown, Aliwal North and the Orange Free State area (including the syntype of *H. longituba*, *Cooper 746*) seem consistently shorter and have smaller flowers, the bracts in the 15–20 mm range and perianth tube 12–15 mm long. All collections have leaves with clearly raised margins, and the upper parts of the leaves are often dry or broken, possibly from fire scorching or trampling.

A tendency for raised margins, and also broken leaf apices is evident in some specimens from the eastern Karoo as well, e.g. the *MacOwan* collection (Herb. Norm Aust. Afr. *61*) at Zürich, which suggests that the Orange Free State–north eastern Cape plants really do belong here, and that the leaf differences may at least in part be related to climate and season. This somewhat shorter-tubed form links *H. longituba* with the similar and related Transkei, Lesotho and Natal species, *H. vernalis* Hilliard & Burtt, which has lilac-coloured flowers and is day-blooming (Hilliard & Burtt, 1982; pers. comm.), in contrast to the white-flowered and evening-blooming *H. longituba*.

Several collections from the eastern Cape also match *Hesperantha longituba* well, notably *Archibald 5552* and *Rogers 2223* from near Paterson, and *Rogers 3586* from Alicedale. Other eastern Cape collections cited below as belonging to *H. longituba* consist of depauperate specimens with short leaves and solitary flowered spikes, the most striking example of which is *Schönland 361* from the Grahamstown flats. It is unlikely that these dwarfed plants constitute a distinct species, nor are they referable to any other known species. Similar dwarfed and single-flowered plants form part of the gathering made by Ecklon and Zeyher (*Irid. 220*) near the Orange River, which also comprises more typical, larger, several-flowered plants.

Foster (1948) included in his treatment of *Hesperantha longituba* the synonym *Acidanthera huttonii* Baker. This is a pink-flowered species of *Hesperantha* of damp cliffs and slopes and it blooms in autumn (January–April). It extends from Katberg in the eastern Cape to the Transvaal and is clearly distinct from *H. longituba*.

Hesperantha longituba has a large somewhat globose corm in which the older tunic layers tend to accumulate to an unusual extent. The tunics are clearly imbricate in the few collections where corms are well preserved *(Brynard 80, Corbitt s.n.)* and resemble those of *H. cucullata*. The species is accordingly assigned to section *Imbricata* where it is placed first in the sequence of species. It may be a link between section *Imbricata* and section *Concentrica*. Its closest relative may be *H. cucullata*, from the western Karoo, but it also has similarities with several eastern South African species.

SOUTH AFRICA, ORANGE FREE STATE—2926 (Bloemfontein): Bloemfontein (-AA), *Corbitt s.n.* (NBG *60244*); Dolerite hillside, Bloemfontein, *Corbitt s.n.* (NBG *60243*); Moscos, 10 km from Dewetsdorp on Reddersburg road (-DA), *Muller 1391* (PRE).

CAPE—3024 (De Aar): Rolfontein Nature Reserve, Petrusville distr. (-BB), *Jooste 260* (PRE).
—3026 (Aliwal North): Ruigtefontein (-DA), *Thode A1868* (K, PRE).
—3124 (Hanover): 13 miles from Naauwpoort, Colesburg Div. (-DB), *Fryer s.n.* (BOL *31522*); Compasberg, felsigen Oertern, 5–6000 feet (-DC), *Drège 8470* (G), *8487* (S).
—3125 (Steynsburg): Bangor farm, Middelburg Div. (-AC), *H. Bolus s.n.* (BOL *14049*); Middelburg, *H. Bolus 15* (GRA).
—3126 (Queenstown): "Cis-Garipina, vom nordlichen Fuss der Stormbergen bei Buffelsvalei am Garip", 4–5000 feet (-B), *Ecklon & Zeyher Irid. 220* (119.9) (B, G, LD, MO); Buffelsfontein, Wodehouse (-BC), *Stretton 159* (PRE); Finchams Nek, Queenstown (-DD), *Galpin 2487* (K).
—3223 (Rietbron): Near Murraysburg, farm Bloemfontein, 4700 feet (?-BB), *Tyson 303* (K, SAM, Z); Koudeveld Mt., 5000 feet, *Tyson 303* (B).
—3224 (Graaff-Reinet): Graaff-Reinet, clivis montis, 3200 feet (-BC), *H. Bolus 686* (BOL, K, S, SAM); Karoo Nature Reserve, *Linger 2106* (PRE).
—3225 (Somerset East): Mountain Zebra Nat. Park, Cradock (-AB), *Brynard 80* (K, PRE); Cradock (-BA), *Marloth 2152* (PRE); Slopes of the Boschberg (-DA), *MacOwan s.n.* in Herb. Norm. Aust. Afr. *61* (BOL, G, GRA, K, M, US, WU, Z); Waterkloof valley, Somerset East, *Van der Walt 186* (PRE); Somerset East, *Bowker s.n.* (K, S); Near Middleton, Karoo (-DD), *Rogers s.n.* (BOL *12981*).
—3227 (Stutterheim): Hogsback, forest edge (-AA), *Batten 4* (NBG); Hogsback, *Giffen s.n.* (PRE); 1,5 miles from railway between Amabele and Kubusie (-DA), *De Vries s.n.* (PRE *36280*).
—3325 (Port Elizabeth): Suurberg Pass (-AC), *Bayliss 6049* (MO); 4 miles E of Paterson (-BD), *Archibald 5552* (BOL); Coerney R. valley, 1 mile S of Kromrivier turnoff, *Archibald 5977* (K, PRE); Sandflats (= Paterson), Alexandria Div., *Rogers 2223* (BOL).
—3326 (Grahamstown): Alicedale (-AC), *Cruden 7A* (GRA), *Rogers 3586* (B, K); Howisons Poort (-AD), *Schönland 775* (Z); Grahamstown flats (-BC), *Schönland 361* (Z); Willow Glen farm, Belmont (-BD), *Bayliss 4724* (MO).

Without precise locality: Horncroft, Orange Free State, *Thode A540* (K, PRE); British Kaffraria, *Cooper 1810* (K); Orange Free State, *Cooper 746* (E, G, K, PRE, Z), *Krebs 778 & 780* (B), *Prior s.n.* (K).

13. **Hesperantha cucullata** Klatt, Abh. nat. Ges. Halle **15**: 393 (Ergänz. 59) 1882; Baker, Flora Cap. **6**: 60. 1896. Type: S. Africa, Hantam Geb., *Meyer 9* (B, lectotype, here designated; drawing at S and fragment, perhaps isolectotype, S). **Fig. 16.**

Hesperantha montana Klatt, Abh. nat. Ges. Halle **15**: 393 (Ergänz. 59) 1882; Baker, Flora Cap. **6**: 58. 1896. Type: S. Africa, Cape, Hantam Geb., *Meyer 21* (B, lectotype, here designated; fragment and isolectotype, S).

Hesperantha buhrii L. Bolus, J. Bot. **69**: 13. 1931; Foster, Contr. Gray Herb. **166**: 7–8. 1948. Type: S. Africa, Cape, Nieuwoudtville, *Buhr s.n.* ex Hort. Stanford (BOL *18964*, lectotype, here designated; GRA, K, isolectotypes).

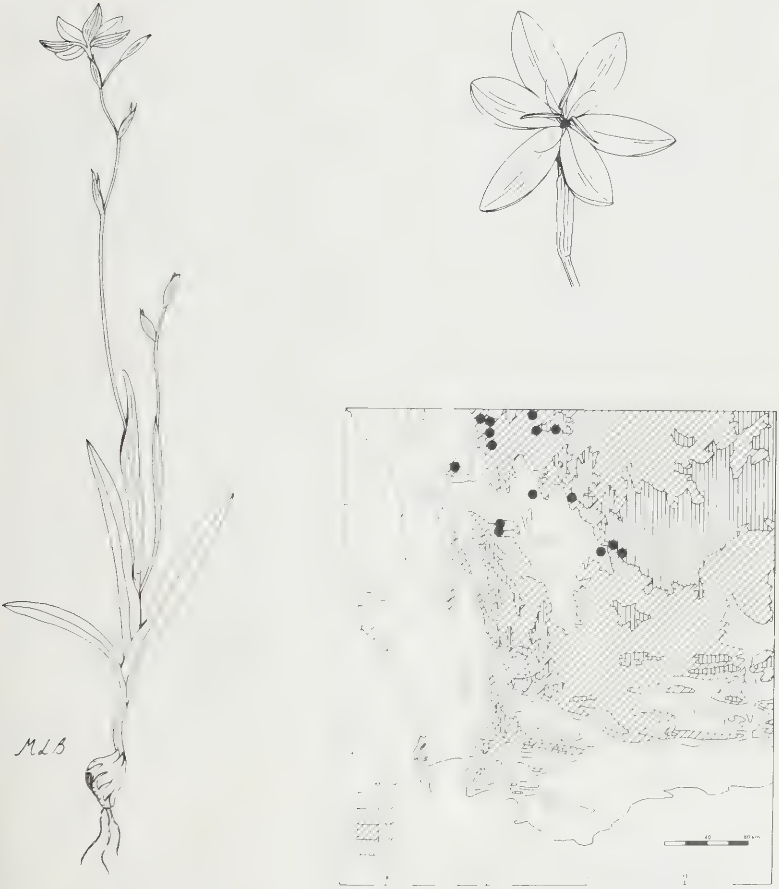


FIG. 16.
Morphology and distribution of *Hesperantha cucullata*. Habit × 0,5; flower life-size (voucher *Goldblatt 3954*, Nieuwoudtville).

Plants (80–)150–300 mm high. *Corm* large, to (7–)9–14 mm in diameter, ovoid, asymmetric, with an oblique base, and prominent down-pointed lateral process, tunics imbricate, dark, woody, innermost layer entire, ridged vertically, outer layers regularly V-notched at base, and divided into rectangular segments, often split above into short cusps. *Cataphyll* solitary, membranous. *Leaves* 3–4, ensiform to falcate, 5–10 mm wide, 70–100 mm long, lower 3 basal, upper basal or inserted above ground, sheathing most, or only lower part of stem. *Stem* erect, simple or branched. *Spike* lightly flexuose, (1–)2–10-flowered; *bracts* 10–12(–15) mm long, membranous, pale green to transparent with green veins, inner about as long as outer. *Flower* hypocrateriform, white, with deep red on reverse of outer tepals, opening towards sunset and then sweet-scented; *perianth tube* 6–9 mm long, reaching to near apex of bracts; *tepals* 15–20 mm long, ovoid, 5–10 mm wide. *Filaments* 3–5 mm long; *anthers* 6–8,5 mm long, articulated and horizontal, pollen white. Ovary 2–3 mm long; style branches to 8 mm long. *Capsule* oblong, to 12 mm long, ca. 5 mm in diameter. *Chromosome number* $2n = 26$ (*Goldblatt 243* as *H. buhrii; Goldblatt 3954*).

Flowering time: late July–mid September–early October; flowers opening after 16h00, closing 18h00.

Distribution: Calvinia district, especially common around Nieuwoudtville extending from the Hantamsberg south to the Roggeveld Mountains, Doorn River basin and Bidouw. Fig. 16.

After a careful examination of a large number of recent collections of the species long known as *Hesperantha buhrii*, I have reached the conclusion that two poorly-known species, *H. cucullata* and *H. montana,* described in 1882 by Klatt, are almost certainly conspecific with it. The reason for the problem surrounding *H. cucullata* and *H. montana* is the incompleteness of the type collections, and the fact that both types appear to represent dwarf forms, while the type and most collections of *H. buhrii* are robust, and tall. Foster (1948) considered *H. cucullata* and *H. montana* conspecific, uniting the two under the name *H. cucullata,* but he treated *H. buhrii* as distinct, which is understandable as he had only one sheet of this species, the type collection, available to him.

Collections such as that of *L. Bolus s.n.* (Nat. Bot. Gard. *1570/30*), *Lewis 5872, Goldblatt 3905* and *5796* comprise a range of plant size from the robust and many-flowered, matching the type of *H. buhrii,* to short and few-flowered forms. These smaller individuals in turn resemble collections of entirely dwarf plants e.g. *Lewis 2385* and *2636, Barker 6544,* and it requires little imagination to see these as close matches for *Meyer 21,* the cormless and flowerless type of *H. montana,* and for *Meyer 9,* the slightly larger type specimen of *H. cucullata,* also now lacking a corm. When described, *H. cucullata* had a corm, and a drawing of it at the Stockholm Herbarium matches exactly the large asymmetric corm with imbricate tunics of *H. buhrii.* The discrepancies in the colour of the flower of *H. cucullata* described by Klatt as lilac with a violet tube should be ignored, for Klatt had only dried material available and the colour of dried flowers often changes, and may not represent the colour of living flowers.

Hesperantha cucullata is best known from the Nieuwoudtville escarpment area, where it is common, but it extends north and east to Calvinia and Loeriesfontein and south east along the Roggeveld escarpment and through the Doorn River basin. Across the Doorn River it grows in the dry eastern valleys of the Cedarberg, such as the Bidouw valley, but westwards it is replaced in similar habitats by *H. falcata*, and the two species are difficult to distinguish except by examination of the corms. Those of *H. cucullata* are large, globose and asymmetric with an oblique flat base and large downward extension, while those of *H. falcata* are usually smaller, and always symmetric, being triangular to campanulate in outline with a flat base.

Populations from the southern end of the Roggeveld clearly represent a distinct race of *Hesperantha cucullata*, but do not differ sufficiently in any morphological feature to warrant taxonomic recognition. These Roggeveld plants grow in very wet situations and although they are usually quite robust, they have only two or three flowers per spike. The flowers are relatively large, with tepals up to 20 mm long, and they have dark brown markings on the reverse of the outer tepals in contrast to the bright red in other parts of the range of this species.

SOUTH AFRICA, CAPE—3118 (Van Rhynsdorp): Top of Gifberg Pass (-DD), *Marsh 520* (STE).

—3119 (Calvinia): Meulsteenvlei, top of Van Rhyns Pass (-AC), *Lewis 5872* (NBG); Nieuwoudtville, *L. Bolus s.n.* (Nat. Bot. Gard. *1570/30* in BOL, GRA, PRE, SAM), *Esterhuysen 5993* (BOL), *Buhr s.n.* (BOL *18964*, STE *10770*, NBG *60247 & 60248*), *Goldblatt 243* (BOL), *Lewis 2284* (SAM), *5852* (NBG), *Barker 9564* (NBG, STE); Klipkoppies, 2 miles NE of Nieuwoudtville, *Nordenstam 2998* (M, S), *763* (S); Glenlyon farm, *Lewis 5876, 5877* (NBG), *Goldblatt 3954* (M, MO, PRE, US, WAG); Grasberg–Nieuwoudtville, *Lewis 5841* (NBG, UC); Oorlogskloof, *Compton 20893* (NBG); Uitkomst farm SW of Nieuwoudtville, *Barker 10749* (K, NBG, STE); 14 km W of Calvinia, on Loeriesfontein road (-BC), *Goldblatt 3938* (MO); Hollerivier, 15 miles NW of Calvinia, *Lewis 2636* (SAM); Loeriesfontein road 15 miles from Calvinia, *Middlemost 1781* (NBG); Western end of Hantamsberg below summit cliffs, *Goldblatt 5790* (MO); Akkerdam, below Hantamsberg, Calvinia (-BD), *Lewis 5812* (NBG); Lokenburg (-CA), *Barker 1478* (BOL, NBG); 15 miles S of Nieuwoudtville, *Lewis 5836* (NBG); 22 miles S of Nieuwoudtville, *Barker 6544* (NBG), *Lewis 2285* (SAM); Driefontein, voor Hantam (-DA), *Marloth 12807* (PRE); 51 km S of Calvinia (-DC), *Goldblatt 3905* (MO); Vondelingsfontein, Roggeveld Mts. (-DD), *Thompson 2479* (STE).

—3219 (Wuppertal): Bidouw Valley (-AA), *Goldblatt 2535* (C, M, MO, NBG, PRE), *6160* (MO); Bidouw Mts., *Compton 7761* (NBG); Mountain slopes above Welbedacht, *Lewis 5223* (M, NBG); Pass into Bidouw valley, *Thompson 338A* (PRE, STE).

—3220 (Sutherland): Geelhoek (Vyffontein), Sutherland distr. (-AB), *Acocks 17184* (K, PRE); Uitkyk farm, Roggeveld (-AC), *Marloth 9718* (PRE), *Goldblatt 6359*

(MO); Between Sneeukrans and Kromberg, *Oliver 4416* (K, PRE, STE); Voëlfontein farm, NW of Sutherland (-AD), *Goldblatt 6317* (K, MO, NBG, PRE, S, WAG); Fransplaas, *Marloth 9831* (K, PRE); Tuinplaas, Tanqua Karoo (-CD), *Marloth 10373* (PRE).

Without precise locality: Hantams Geb., *Meyer 17* (B), *Meyer 18*, in part (B).

14. **Hesperantha vaginata** (Sweet) Goldbl., Jl S. Afr. Bot. **36**: 298. 1970. **Fig. 17.**

Geissorhiza vaginata Sweet. Br. Fl. Gard. **2**: tab. 138. 1826; Baker, Flora Cap. **6**: 73. 1896 in synon. sub *G. inflexa* (de la Roche) Ker. Type: illustration in Br. Fl. Gard. 2: tab. 138.

Hesperantha metelerkampiae L.Bolus, Ann. Bolus Herb. **4**: 114. 1927. Type: South Africa, Cape, near Nieuwoudtville, *Metelerkamp s.n.* (BOL *18555*, holotype).

Hesperantha stanfordiae L.Bolus, S. African Gard. **21**: 281–282. 1931. Type: South Africa, Cape, near Nieuwoudtville, *Buhr s.n.* ex Hort. *K. Stanford* (BOL *19880*, lectotype; K, S, isolectotypes). (Description suggests two type specimens, but sheet at BOL is all one gathering.)

Hesperantha inflexa (de la Roche) Foster, sensu Foster, Contr. Gray Herb. **135**: 77. 1941 (= *Geissorhiza inflexa* (de la Roche) Goldbl.) (see Goldblatt & Barnard, 1970).

Plants 120–180 mm high. *Corm* asymmetric, globose with one end obliquely flattened and with a well-developed foot projection, tunics imbricate, dark, woody, the layers split and notched into segments below. *Cataphyll* solitary. *Leaves* usually 4 or 5, basal, or upper inserted in lower part of stem, 8–10 mm wide, falcate, obtuse, 50–90 mm long, uppermost leaf sheathing the lower half of stem, but with free apex. *Stem* erect, single, or 2–3, branched from base. *Spike* weakly flexuose, (1–)2–4-flowered; *bracts* membranous, or pale green when young, 20–25 mm long, inner smaller, by several millimetres, two-veined, and bifurcate. *Flower* large, infundibuliform, clear yellow, or dark brown-black in throat and in upper half (or apices) of tepals, opening ca. 15h00; *perianth tube* 5–8 mm long, narrow at base, widening gradually to throat; *tepals* subequal, 30–35 mm long, lanceolate, 15–17 mm at widest point. *Filaments* ca. 3 mm long; *anthers* (11–)12–15 mm long. Ovary ca. 3 mm long, style branches ca. 5 mm long. *Capsule* 9–10 mm long, obovoid. *Chromosome number* $2n = 26$ (*Goldblatt 93; 259*, both as *H. stanfordiae; 6229*).

Flowering time: mid-August–September; flowers opening ca. 15h00, closing about 18h30.

Distribution: western Karoo in the Calvinia district, especially common in the vicinity of Nieuwoudtville but local at Kareeboomfontein, SW of

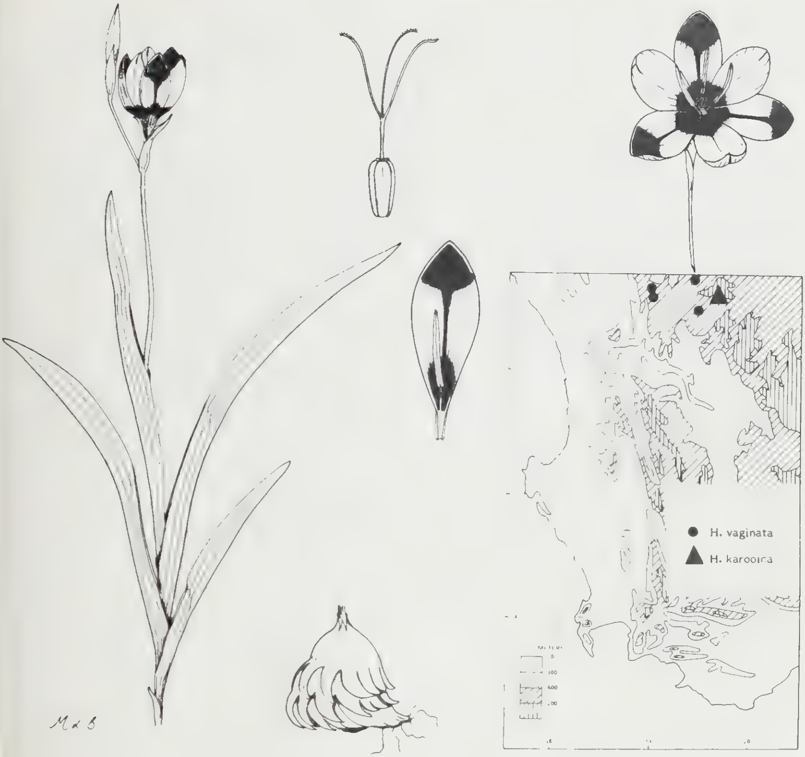


FIG. 17.
Morphology of ***Hesperantha vaginata*** and distribution of *H. vaginata* and *H. karooica*. Habit × 0,5; flower and corm life-size; tepal and gynoecium × 2 (voucher *Goldblatt 4035*, Nieuwoudtville).

Calvinia and Paardekraal NW of Calvinia, usually on heavy clay soils. Fig. 17.

Hesperantha vaginata is a well-known, and striking member of the spring flora of the the Nieuwoudtville area where it was, until recently, believed to be endemic. Recent collections from Kareeboomfontein SW of Calvinia (*Hanekom 2385*) and by Goldblatt from Paardekraal, north of the Hantamsberg (*Goldblatt 6229*), represent significant range extensions. There are two colour forms, a clear yellow, which has been named *H. stanfordia* and one with contrasting dark brown to black markings (Fig. 17). The yellow form, which is now rare, if not extinct, grew immediately around Nieuwoudtville village, while the bicoloured form extends several miles to the north and south of the town where it is found mainly in heavy red clay soil, as well as the localities mentioned above. Near Oorlogskloof farm some miles south I have seen a population in which self- and bicoloured plants grew together. There seems little reason for giving taxonomic recognition to the yellow-flowered plants, which seem to be no more than colour variants.

This species has had a more complex taxonomic history than one would expect from so distinct a plant. It was first described by Sweet in 1826 as *Geissorhiza vaginata*. Subsequently, *Ixia inflexa* de la Roche (1766) was thought to be conspecific and in *Flora Capensis*, *G. vaginata* is treated as a synonym of *Geissorhiza inflexa* by Baker (1896). L. Bolus, working in South Africa, rediscovered the species in the late 1920's and correctly placed it in *Hesperantha*. Thinking the species new, she named the bicoloured form *H. metelerkampiae* and the self-coloured, *H. stanfordiae*. Foster (1941) realised that *Geissorhiza inflexa* sensu Baker was a species of *Hesperantha* and, considering *Ixia inflexa* the earliest name for the species, made the combination *H. inflexa*. He regarded *H. metelerkampiae* as a synonym, and *H. stanfordiae* a variety. This situation continued until 1970 when a collection of specimens from the Leiden Herbarium came to my attention, and proved to contain types and authentic specimens studied by Daniel de la Roche, who had originally described *Ixia inflexa* (Goldblatt & Barnard, 1970). The type material was clearly not a *Hesperantha*, but conspecific with a species of *Geissorhiza* then known as *G. quinquangularis*. Thus, *G. vaginata* was found to be the earliest name for the species, and accordingly the combination in *Hesperantha* was made. Thus developed the unfortunate situation where a fairly well-known species had four different specific names in a 50 year period.

Hesperantha vaginata has no obvious relatives and is a typical, though unusually large-flowered member of the genus. A possible close ally may be *H. karooica*, a smaller, yellow-flowered species from the flats below the Hantamsberg.

SOUTH AFRICA, CAPE—3119 (Calvinia): Nieuwoudtville (-AC), *Buhr s.n.* (STE *17317*), *Buhr s.n.* (NBG *60255*), *Metelerkamp s.n.* (BOL *18555*), (NBG *60257*, ex hort. *Metelerkamp*), *Buhr s.n.* ex hort. *Stanford* (BOL *19880*, K), *Goldblatt 93* (J); 1 mile S of Nieuwoudtville, *Goldblatt 448* (BOL); Glenlyon farm, *Hardy 72* (K, M, NBG, PRE), *Goldblatt 4035* (E, MO, PRE, US), *259* (BOL), *Oliver & Mauve 57* (STE); 2 miles N of Nieuwoudtville, *Hardy 78* (NBG, PRE); Klip Koppies N of Nieuwoudtville, *Lewis 5857* (M, MO, NBG, S, UC), *L. Bolus s.n.* (BOL *19440*, K), *Nordenstam 1925* (S); Oorlogskloof farm, S of Nieuwoudtville, *Goldblatt 352* (BOL); Paardekraal farm, 40 km NW of Calvinia, deep red clay (-BC), *Goldblatt 6229* (EA, K, MO, NBG, PRE, S, US, WAG); Kareeboomfontein, Calvinia, west of Rebunie (-DA), *Hanekom 2385* (MO).

Without precise locality: Hantams Geb., *Meyer 1* (B).

15. **Hesperantha karooica** Goldbl., sp. nov.

Plantae 30–50 mm altae; *cormo* 8–12 mm in diametro, globoso, tunicis imbricatis, *foliis* 3–4, basalibus, 3–4 mm latis, *spicis* 1–2 floribus, *bracteis* 12–15 mm longis, *floribus* stellatis, *tubo perianthii* ca. 5 mm longo, tepalis ca. 20 mm longis, *filamentis* ca. 3 mm longis, *antheris* 9 mm longis.

Type: S. Africa, Cape, Calvinia commonage, *Stayner s.n.* (NBG *87606*, holotype; STE *31028*, isotype).

Plants small, 30–50 mm high. *Corm* asymmetric, elongate-globose with an oblique flat side and prominent downward projection; tunics blackish, imbricate, woody, several-layered, outer rather broken, deeply and irregularly notched below, drawn into bristles above. *Cataphyll* solitary, membranous. *Leaves* 3–4, basal, falcate, ca. 30 mm long, 3–4 mm wide, obtuse to subacute, uppermost leaf sheathing most of the stem. *Stem* 10–20 mm long, solitary or 1–2, branched from the base. *Spike* 1–2-flowered, not flexed; *bracts* pale green, subherbaceous, 12–15 mm long, inner about as long as outer, much narrower, submembranous. *Flower* yellow, stellate, outer tepals purplish on reverse; *perianth tube* ca. 5 mm long, enclosed in bracts; *tepals* ca. 20 mm long, lanceolate, outer ca. 9 mm wide, inner 7 mm wide. *Filaments* ca. 3 mm; *anthers* 9 mm long. Ovary 2,5–3 mm, style branches ca. 9 mm long. *Capsule* and seeds unknown. *Chromosome number* unknown.

Flowering time: August.

Distribution: known only from the commonage at Calvinia in the western Karoo, at the foot of the Hantamsberg. Fig. 17.

This rare species, known from only two collections, is apparently related to *Hesperantha vaginata* which also occurs in the Calvinia district. The latter is very common in the Nieuwoudtville area 70 km to the west, but is also found near Driefontein S of Calvinia and at Paardekraal to the north west.

Its large, globose, asymmetric corm with overlapping tunics places *H. karooica* clearly in section *Imbricata*. It shows a strong tendency for reduction of the aerial stem, and is probably close to the line leading to the acaulescent species of the section, *H. humilis, H. flava*, and *H. hantamensis* in which the aerial part of the stem is reduced and the flowers have a correspondingly long perianth tube to raise the flower above ground.

Hesperantha karooica probably flowers irregularly from year to year, otherwise it would certainly have been collected more often in the comparatively well-botanised area around Calvinia.

SOUTH AFRICA, CAPE—3119 (Calvinia): Commonage at Calvinia (-BD), *Stayner s.n.* (NBG *87606*, STE *31028*); Akkerdam, foot of Hamtamsberg, *Lewis 5810* (mixed collection with *H. bachmannii*) (S).

16. **Hesperantha humilis** Baker, J. Bot. **14**: 239. 1876 et Flora Cap. **6**: 62. 1896; Foster, Contr. Gray Herb. **166**: 16. 1948. Type: S. Africa, Cape, Roggeveld near Jakhalsfontein, *Burchell 1320* (K, holotype). **Fig. 18.**

Plants small, 30–70 mm high with aerial stem usually lacking, rarely very short. *Corm* large, 12–16 mm in diameter, more or less globose, with an oblique flat side, tunics imbricate, blackish, usually with several layers superimposed, outer much broken, all fairly regularly V-notched below, drawn into points apically. *Cataphyll* evidently lacking or solitary, membranous, dry and brownish above ground. *Leaves* (2–)3, basal, falcate, comparatively broad, 20–70 mm long, 6–8 mm wide, obtuse. *Stem* usually entirely underground, occasionally just emerging (rarely up to 80 mm long), single or occasionally 2. *Spike* 1–2(–3)-flowered; *bracts* dimorphic, outer large, leaf-like, green, 20–30 mm long, carinate, inner bract entirely enclosed, smaller, membranous. *Flower* hypocrateriform, pink, or rose with a dark throat (when dry, inner tepals pale); *perianth tube* 17–24 mm long, initially as long as the bract, but later somewhat longer; *tepals* 17–25 mm long, subequal, ovoid, 8–11 mm wide. *Filaments* 3–4 mm long; *anthers* 4,5–8 mm, articulated. Ovary 3 mm, style branches to 12 mm. *Capsule* large, oblong, 15–20 mm long. *Chromosome number* 2n = 26 (*Goldblatt s.n.*, no voucher – Matroosberg Station; *6341*).

Flowering time: July–August(–September at high altitudes); flowers open in early morning, and close an hour before dark.

Distribution: east of Hex River Pass to Whitehill, the Klein Roggeveld and Roggeveld, extending north to the Hantamsberg at Calvinia; mainly clay flats and slopes, but also on sandy soils derived from Cape sandstone. Fig. 18.

Hesperantha humilis is relatively common in the high-lying country east of the Hex River Pass, despite the few collections for so large an area suggesting the contrary. It extends east of the Pass and north of the Witteberg Mountains as far as Whitehill, northwards in the Klein Roggeveld, and along the Roggeveld escarpment to Sneeukrans. There is a single collection (*Marloth 10459*) from the Hantamsberg, over 100 km to the north. Plants

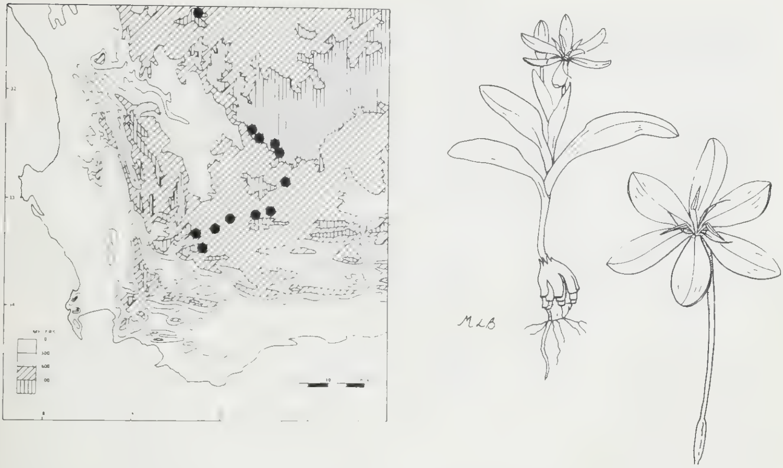


FIG. 18.
Morphology and distribution of *Hesperantha humilis*. Habit × 0,5; flower life-size (voucher *van Zyl s.n.* no voucher, Roggeveld).

from the Sutherland area are generally more robust and have slightly larger flowers of a reddish colour but these differences do not seem to warrant taxonomic recognition. *Hesperantha humilis* is closely related to *H. hantamensis*, another dwarf species, known only from the flats below the Hantamsberg at Calvinia. The two share a similar habit, with flowers borne at or close to ground level, and identical large herbaceous bracts. *Hesperantha hantamensis* has white flowers with smaller tepals than *H. humilis* and the two are easily distinguished. Also related is the poorly-collected *H. flava*, a yellow-flowered species, very similar in general appearance to *H. humilis*. Apart from colour and small differences in flower size, and the fact that *H. flava* consistently has only two basal leaves, there is nothing to distinguish these two species morphologically. However, while *H. humilis* is a day-blooming species, with flowers closing around 17h00, flowers of *H. flava* only open at about this time, and remain open most of the night, closing only a few hours before dawn.

SOUTH AFRICA, CAPE—3119 (Calvinia): Renosterhoek, Hantam Mts. (-BD), *Marloth 10459* (B, PRE).
—3220 (Sutherland): Quaggasfontein, NW of Sutherland, near Uitkyk (-AB), *Goldblatt 6354* (MO); Sneeukrans Mt., S of Voëlfontein farm house, 4500 ft (-AD), *Goldblatt 6341* (MO); Voëlfontein, Sutherland distr., *Hall 3250* (NBG); Flats SW of Swaarweerberg, Sutherland (-BC), *Thompson 1774* (K, STE); Top of Verlaten

Kloof, S of Sutherland (-DA), *Goldblatt 580* (BOL); Waterkloof near Sutherland, *Marloth 9677* (PRE); Towards Waterkloof, *Marloth 10403* (B, PRE); Roggeveld near Jakhalsfontein, *Burchell 1320* (K); Klein Roggeveld (-D), *Compton 7278* (NBG).
—3319 (Worcester): 15 miles N of Koo, 3500 feet (-DB), *Stayner s.n.* (NBG *62763*).
—3320 (Montagu): Whitehill, 3000 feet (-BA), *Adamson s.n.* (BOL); Whitehill ridge, *Compton 4274* (BOL, K, NBG); 2 miles W of Matjiesfontein, *Goldblatt 658* (BOL); Matjiesfontein, stony clay, *Hall 2237* (NBG); Lower slopes of the Witteberg above Bantams on FM tower road, *Goldblatt 3776*, (K, MO, PRE, S).

17. **Hesperantha flava** Lewis, S. African Gard. **23**: 255. 1933; Foster, Contr. Gray Herb. **166**: 12. 1948. Type: S. Africa, Cape, Whitehill, *Compton 4276* (BOL, lectotype here designated; K, isolectotype). **Fig. 19.**

Plants small, 40–60 mm high, including flowers, with aerial stem very short or lacking. *Corm* (as in *H. humilis*) comparatively large, to 15 mm in diameter, globose, strongly asymmetric, with one side flattened, and a prominent downward projection, tunics imbricate, dark, outer breaking into vertical segments that are drawn into bristles above. *Cataphyll* solitary, membranous. *Leaves* two (rarely with a third very small one), basal, unequal, lower 25–40 mm long, upper 10–20 mm long, fairly broad, 4–10 mm wide, obtuse, oblong-falcate. *Stem* entirely underground, or up to 12 mm

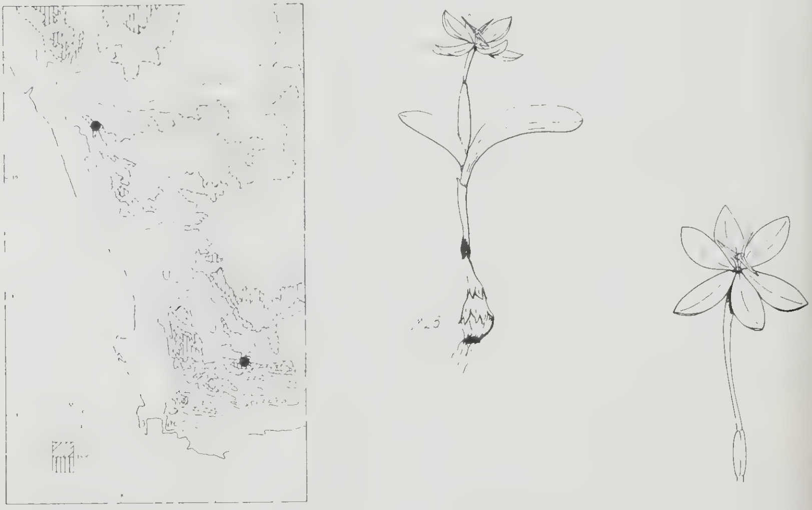


FIG. 19.
Morphology and distribution of *Hesperantha flava*. Habit × 0,5; flower life-size (voucher *Goldblatt 6074*, Ghaap Kop, Matjiesfontein).

above ground, simple, sometimes bearing a short narrow bract-like leaf below the bracts. *Spike* 1–2-flowered; *bracts* 15–20 mm long, outer herbaceous, evidently truncate, or obtuse, inner bract enclosed, membranous, but as long. *Flower* hypocrateriform, yellow, outer tepals dark brown on reverse; *perianth tube* cylindric, 18–28 mm long, initially shortly emerging from bracts, later to 12 mm longer; *tepals* unequal, outer 13–15 mm long, 5–8 mm wide, obovate, inner 1–2 mm shorter. *Filaments* ca. 3,5 mm long; *anthers* 5–7 mm. Ovary 4–5 mm, style branches 4–8 mm. *Capsule* oblong, 15–25 mm long. *Chromosome number* $2n = 26$ (*Goldblatt 5760; 6074*).

Flowering time: July–August; flowers opening at about 17h00 and closing a few hours before dawn.

Distribution: known only from the foot of the Witteberg between Matjiesfontein and Whitehill in the western Karoo, and around Steinkopf, northern Namaqualand, in stony soils of decomposing shale. Fig. 19.

Hesperantha flava is a rare night-blooming species closely related to the fairly widespread and common, pink-flowered *H. humilis*. The two are very similar morphologically, having a stemless growth habit, with broad, falcate, basal leaves, and large, conspicuous, herbaceous floral bracts. *H. flava* typically has only two, very unequal leaves, and *H. humilis* usually has three, the lower two similar in size. In addition to leaf number, and flower colour, the species differ in flower phenology. *H. humilis* is day-blooming, with flowers open from early morning until about 17h00, while *H. flava* is night-blooming. Its flowers open between 16h00 and 17h00 and close a few hours before dawn. These two species are so similar that they must have diverged recently, and in response to the habits of different pollinating insects. Visitors to *H. humilis* have not yet been recorded but Vogel (1954) reports that *H. flava* is visited, and presumably pollinated, by hawk moths.

Hesperantha flava has a peculiar distribution. It is known from the western Karoo at the foot of the Witteberg in the Matjiesfontein–Whitehill area, and on localised shale outcrops over 450 km to the north, near Steinkopf in Namaqualand. The Steinkopf locality was first reported by Vogel (1954), but only in the literature and populations in this area were rediscovered in 1970 by myself. There are no similar distribution patterns in Iridaceae, in which disjunct ranges of this size are rare among species in southern Africa.

SOUTH AFRICA, CAPE—2917 (Springbok): Slope 1 mile W of Steinkopf (-BD), *Goldblatt 680* (BOL); 4 km W of Steinkopf. *Goldblatt 5750* (MO), *6003* (MO, NBG).
—3320 (Montagu): Whitehill (-BA), *Compton 4276* (BOL, K); W slope at foot of Ghaap Kop, near Matjiesfontein, *Goldblatt 6074* (MO, NBG), *6373A* (MO).

18. **Hesperantha hantamensis** Schltr. ex Foster, Contr. Gray Herb. **166**: 15. 1948. Type: S. Africa, Cape, Calvinia, dolerite hills, 1 000 m, *Marloth 10262* (B, holotype; PRE, STE, isotypes). **Fig. 20.**

Plants small, stem subterranean or very shortly produced above ground. *Corm* 12–15 mm in diameter, asymmetrical, more or less conic, with an oblique flat side; tunics imbricate, blackish, usually with several concentric layers lying on one another, outer much broken, all fairly regularly V-notched below and often drawn above into stiff bristles. *Cataphyll* solitary, membranous, evidently dry and brownish above ground. *Leaves* 3–4, basal, falcate, comparatively broad, 20–40 mm long, 5–6 mm wide, obtuse. *Stem* usually underground or extending above ground for up to 60 mm, simple or with a single basal branch. *Spike* 1–3-flowered, *bracts* dimorphic, outer large, leaf-like, green, 15–25 mm long, carinate, inner bract entirely enclosed, smaller, membranous. *Flower* hypocrateriform, white with purple on reverse of outer tepals; *perianth tube* 14–20 mm long, initially slightly longer than the bracts, but becoming longer; *tepals* 8–12 mm long, ovoid, 4–5 mm wide, inner slightly smaller. *Filaments* ca. 3–5 mm long; *anthers* 5–6 mm, articulated. Ovary 2–3 mm, style branches to 9 mm long. *Capsule* oblong, ca. 12 mm long. *Chromosome number* unknown.

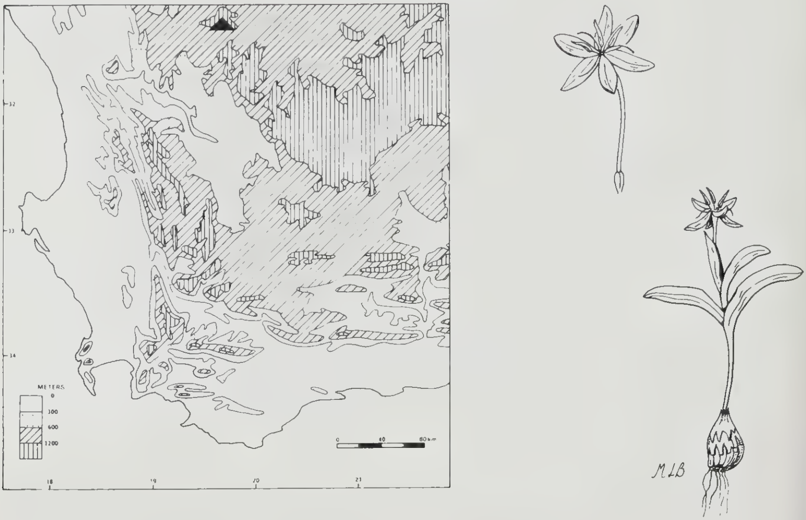


FIG. 20.
Morphology and distribution of *Hesperantha hantamensis*. Habit × 0,5; flower life-size (voucher *Goldblatt 6065*, Hantamsberg flats).

Flowering time: July(–early August); flowers opening 13h00–14h00, and closing in early evening.

Distribution: known only from the flats at the foot of the Hantamsberg near Calvinia. Fig. 20.

This species has been collected infrequently and is consequently poorly known. It may not be as rare as the record suggests, but has probably been overlooked because of its small size and short flowering period. It is related to *Hesperantha humilis* which extends from the Hantamsberg southwards, and has a larger pink or red flower, but is otherwise very similar in habit, and vegetative morphology. Both species usually have a stem that is entirely underground, or only shortly produced above ground. The white flowers of *H. hantamensis* have tepals in the 8–12 mm long range while those of *H. humilis* are 17–20 and even up to 24 mm in length. The yellow-flowered *H. flava* is allied to these two species, being similar in general morphology, but usually having only two leaves and a single yellow flower on each plant. This group of three species is probably allied to *H. vaginata* and *H. karooica* and more generally to *H. cucullata,* all of which have similar corms. The other dwarf and sessile, or very short-stemmed species of the winter rainfall area, *H. latifolia* and *H. luticola,* appear unrelated, having very different corm and bract morphology.

SOUTH AFRICA, CAPE—3119 (Calvinia): Foot of the Hantamsberg, near Calvinia (-BD), *Lewis 5811* (NBG), *Goldblatt 280* (BOL), *6065* (MO, NBG); Hantams Geb., *Meyer 18* (B); Calvinia, northern dolerite hills, *Marloth 10262* (B, PRE, STE).

19. **Hesperantha purpurea** Goldbl., sp. nov. **Fig. 21.**

Plantae 80–250 mm altae, *cormo* 8–12 mm in diametro, globoso, tunicis imbricatis, *foliis* 4–5, basalibus, 7–10 mm latis, *spicis* 1–3 floribus, *bracteis* 15–20 mm longis, acutis, *floribus* hypocrateriformibus, purpureis, atromaculatis ad basem tepalorum, *tubo perianthii* ca. 20 mm longo, *tepalis* 16–20 mm longis, *filamentis* brevibus, 1,5–2 mm longis, *antheris* 5–6 mm longis.

Type: S. Africa, Cape, Paardekraal farm NW of Calvinia, *Goldblatt 6246* (MO, holotype; K, NBG, PRE, S, isotypes).

Plants 80–250 mm high. *Corm* ± globose with an oblique flat side, 8–12 mm in diameter, tunics black, hard, imbricate, notched below and above. *Cataphyll* evidently single, membranous, below ground. *Leaves* 4–5, all basal, erect to strongly falcate, the lower obtuse, 30–70 mm long, 7–10 mm wide. *Stem* short to long, simple or branching from near base, up to 15 mm above ground, sometimes concealed by leaf bases. *Spike* 1–3-flowered; *bracts* green, 15–20 mm long, inner slightly shorter than outer. *Flower* ±

hypocrateriform, long-tubed, reddish-purple with dark marking at base of each tepal, and white in the throat and tube, open during the day; *perianth tube* ca. 20 mm long, widening near apex; *tepals* 16–20 mm long, 5–7 mm wide, oblanceolate. *Filaments* 1,5–2 mm long; *anthers* 5–6 mm long. Ovary 3–4 mm long, style branches 10–14 mm long. *Capsule* ovoid, 10–14 mm long. *Chromosome number* $2n = 26$ (also 39) (*Goldblatt 6246*).

Flowering time: August–September.

Distribution: known only from the hills and flats north of the Hantamsberg, on clay soils on moister S-facing slopes. Fig. 21.

Hesperantha purpurea is known only from the type gathering which I made in 1981. It is probably fairly restricted in its range, but the area where it was discovered north of the Hantamsberg is poorly known botanically and *H. purpurea* may be more common in this general area than the present record indicates. The only known population was found on the moister, S-facing slope of a rocky hill on the farm Paardekraal, growing in heavy clay soil. I am indebted to Mr. B. Visagie for the discovery of *H. purpurea*, which was found while accompanying him on a tour of his farm.

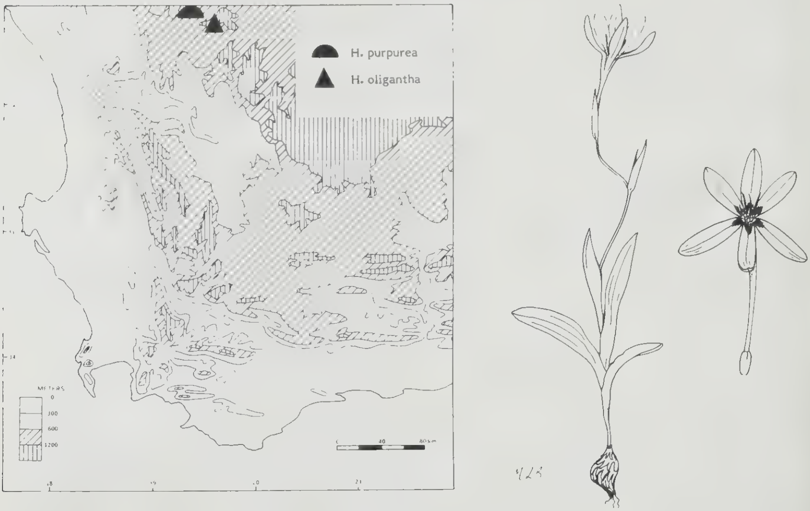


FIG. 21.
Morphology of *Hesperantha purpurea* and distribution of *H. purpurea* and *H. oligantha*. Habit × 0,5; flower life-size (voucher *Goldblatt 6246*, Paardekraal, NW of Calvinia).

The large subglobose corm with imbricate tunics is typical of section *Imbricata*, which is centred in the western Karoo. *Hesperantha purpurea* is thus one more example of the radiation that has taken place in *Hesperantha* along the border of the western Karoo and Cape Region. The species is distinct in the section in its bright purple flower colour with dark markings at the bases of the tepals, and in its long perianth tube. It is probably closely related to the poorly-known *H. oligantha* which has been collected only once, in 1900 on the Hantamsberg, a short distance to the south east. *Hesperantha purpurea* is very variable in plant size and leaf development, depending on the amount of shading and moisture available, but even the smallest specimens collected, ca. 8 mm high, seem more robust, and have much broader, and shorter, leaves than the very dwarf *H. oligantha* which stands 6–8 mm high including the flowers, and has long narrow leaves 2–3 mm wide. The flowers also differ, although those of both species are purple. *Hesperantha purpurea* has a perianth tube ca. 20 mm long, exserted a short distance from the soft textured, acute bracts usually ± 15 mm long; fairly large corms 8–12 mm in diameter; and unusually short stamens with filaments 1,5–2 mm long. In contrast, *H. obligantha* has a longer perianth tube 25–35 mm long, well exserted from firm, obtuse bracts 15–20 mm long; small corms evidently only 4–5 mm in diameter; and long stamens with filaments up to 10 mm long. There seems good reason to regard these two species as related, but they are clearly quite distinct.

SOUTH AFRICA, CAPE—3119 (Calvinia): Paardekraal farm NW of Calvinia, S side of rocky hill (-BC), *Goldblatt 6246* (K, MO, NBG, PRE, S).

20. **Hesperantha oligantha** (Diels) Goldbl., Contrib. Bol. Herb. **4**: 91. 1972.

Lapeirousia oligantha Diels, Bot. Jahrb. **44**: 117. 1910. Type: S. Africa, Cape, Hantamsberg, Calvinia, *Diels 735* (B, holotype; MO, isotype).

Plants small, 60–80 mm high, including flowers. *Corm* globose-elongate, with an oblique flat side, 4–5 mm in diameter, tunics black, apparently imbricate, notched below and above. *Cataphyll* evidently single, membranous, below ground. *Leaves* 3 or 4, all basal, weakly to strongly falcate, 30–70 mm long, 2–3 mm wide. *Stem* short, simple, rarely more than 10 mm above ground, sometimes underground or concealed by leaf bases. *Spike* 2(–3)-flowered; *bracts* green, well-developed, 15–23(–30) mm long, inner entirely enclosed in outer, and shorter. *Flower* evidently infundibuliform, long-tubed, purple; *perianth tube* 25–35 mm long, slender, widening near apex; *tepals* 15–18 mm long, ca. 3 mm wide, oblanceolate. *Filaments* to 10 mm long; *anthers* 5 mm long. Ovary ca. 4 mm long, style branches ca. 10 mm long. *Capsule* and seeds unknown. *Chromosome number* unknown.

Flowering time: September.

Distribution: known only from the western end of the Hantamsberg at Calvinia; on moist S-facing slopes at 1 300 m. Fig. 21.

Hesperantha oligantha is known only from the single collection made by Diels in 1900. It is clearly rare, for the locality where it was found has been visited regularly by botanists and it has not been recollected. It is evidently restricted to a small part of the Hantamsberg, on damp S-facing slopes.

The relationships of *Hesperantha oligantha* are uncertain as the corm tunics on the type collection are incomplete. The fragmentary material present suggests that the tunics were imbricate and of the kind found in species of section *Imbricata*, but the corms are small for the section. They correspond in size with those of *H. bachmannii* and *H. pallescens* and, while its affinities may lie with these two species rather than with the larger cormed members of the section, it shows certain resemblances with the recently discovered *H. purpurea*. The similarities include unusually long perianth tube and purple flower colour. The differences between the two species are discussed under *H. purpurea*.

SOUTH AFRICA, CAPE—3119 (Calvinia): Western end of the Hantamsberg, moist S slopes at 1 300 m (-BC), *Diels 735* (B, MO).

21. **Hesperantha pallescens** Goldbl., sp. nov. **Fig. 22.**

Plantae 100–200 mm altae, *cormo* 3–6 mm in diametro, globoso, tunicis imbricatis, *foliis* 4–5 ± basalibus, 1–3 mm latis, *spicis* 1–4 floribus, *bracteis* 12–16 mm longis, acutis, *floribus* infundibuliformibus, pallidis flavis, *tubo perianthii* 12–20 mm longo, *tepalis* 15–16 mm longis, *filamentis* 5 mm longis, *antheris* 5–6 mm longis.

Type: S. Africa, Cape, near The Rest, below Piekeniers Kloof Pass, S side, *Goldblatt 5645* (MO, holotype; B, BOL, C, K, M, NBG, P, PRE, S, US, WAG, isotypes).

Plants small to medium, 100–200 mm high. *Corm* small, globose, asymmetric, 3–6 mm in diameter, flattened at one end and with an obscure down-pointed projection, tunics brown, outer layers imbricate, much broken, and notched below, inner entire or beginning to split below, bearing many cormlets on short runners produced from flat side. *Cataphyll* dry, brown, often broken or lost. *Leaves* 4–5, narrow, linear, slightly falcate, 1–3 mm wide, all basal or upper inserted on stem above ground, and partly sheathing. *Stem* usually straight, simple or 1–2-branched, branches produced from aerial nodes. *Spikes* (1–)2–4-flowered; *bracts* 12–16 mm long, pale green with membranous margins, acute, inner bracts smaller and slightly shorter. *Flower* pale yellow, infundibuliform, actinomorphic, flowers opening after 12h30; *perianth tube* initially exserted 2–3 mm from bracts, later much exserted, 12–20 mm long, slender, widening somewhat near apex; *tepals* cupped, 15–16 mm long, lanceolate, subequal, ca. 5,5 mm at widest point, inner slightly narrower. *Filaments* 5 mm long, inserted at top of tube, con-

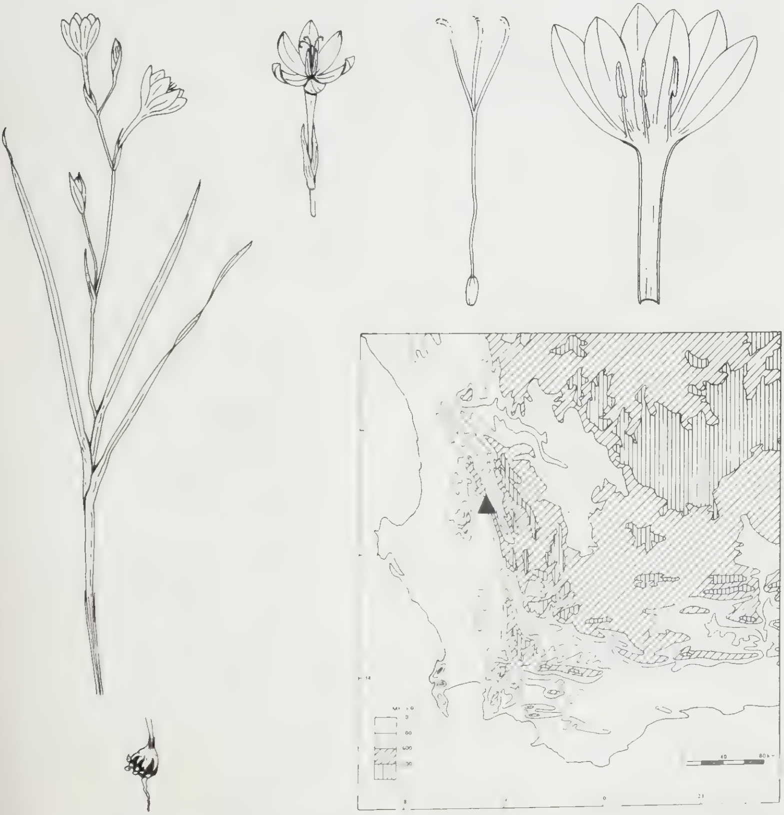


FIG. 22.
Morphology and distribution of *Hesperantha pallescens*. Habit and corm × 0,5; flower life-size; gynoecium and opened flower × 1,5 (voucher *Goldblatt 5645*, below Piekeniers Kloof Pass).

nate; *anthers* 5–6 mm, diverging from base. Ovary ca. 3 mm long, style branches spreading to pendent. *Capsule* obovate, ca. 10 mm long. *Chromosome number* 2*n* = 26 (*Goldblatt 5645*).

Flowering time: August–mid September; flower opening 12h00–13h00, closing near sunset.

Distribution: clayey lower SW slopes of the Olifants River Mountains, evidently very local. Fig. 22.

Hesperantha pallescens is known from only a small area of the south western Cape, and appears to be one more of the very local endemic species of this floristically rich area. It is distinctive in having a very long perianth tube, and pale yellow-cream, actinomorphic flower. It has a small subglobose corm with imbricate tunics regularly notched below, and bearing many very small cormlets around the base. In both size and appearance, the corm resembles that found in the widespread *H. bachmannii* and it is to this species that *H. pallescens* is probably most closely allied. The flowers of *H. bachmannii* are very different, having a short, curved perianth tube and pendulous anthers, so that there is no possibility of confusing the two species. The flowers of *H. pallescens* open shortly after noon and close towards evening at about 17h30, at about the same time that the flowers of *H. falcata,* which is sympatric, begin to open. Despite its fairly large, attractive flowers, *H. pallescens* has been found to be strongly autogamous in the greenhouse. This is unusual, and in its native habitat it is probably regularly visited by pollinating insects.

SOUTH AFRICA, CAPE—3218 (Clanwilliam): Near The Rest, below Piekeniers Kloof Pass (-DB), *Goldblatt 5645* (B, BOL, C, K, M, MO, NBG, P, PRE, S, US, WAG); The Rest, *Gillett 3712* (BOL, K, STE).

22. **Hesperantha bachmannii** Baker, Bull. Herb. Boiss. ser. 2,**1**: 863. 1901; Foster, Contr. Gray Herb. **166**: 4. 1948. Type: S. Africa, Cape, near Hopefield, *Bachmann 1177* (G, lectotype designated by Foster (1948); B, Z, isolectotypes). **Fig. 23.**

Hesperantha virginea Ker. Konig & Sims Ann. Bot. **1**: 225. 1805 nomen nudum.

Hesperantha angusta (Jacq.) Ker, sensu Baker, Handbk. Irid. 152. 1892 & Flora Cap. **6**: 65.1896

Plants 150–300 mm high. *Corm* globose, to 10 mm long and 6–8 mm at widest, base oblique, with a small downward projection, and often bearing several small bulbils round the base; tunics dark brown, woody, entire above, notched below into segments, with tunics of previous years smaller, and accumulated in overlapping layers above. *Cataphylls* dry, membranous, 1–2. *Leaves* 3–4, linear to slightly falcate, flat, very thin-textured, about half as long as the plant, 2–7 mm wide, uppermost sheathing lower half of stem. *Stem* erect, sometimes with 1–2 branches produced from near the base, occasionally also from an upper node; bearing leafy bracts at the nodes. *Spike* slightly flexuose, 2–6(–9)-flowered; *bracts* herbaceous with a hyaline margin, outer 12–20(–30) mm long, acute, inner slightly smaller, obscurely notched at apex. *Flower* white (–cream), facing downwards, usually opening in late afternoon and sweet-scented; *perianth tube* ca. 10 mm long, recurved, shorter than bracts, slightly wider towards apex; *tepals* subequal, outspread when open, 14–20 mm long, elliptic, 5–8 mm at widest, obtuse. *Filaments* ca. 5–6 mm long; *anthers* 6–8 mm, articulated and usually pendent. Ovary 3–4 mm long, style branches ca. 7–8 mm, pendent, reaching to near apex of anthers. *Capsule* ovoid, ca. 6 mm long. *Chromosome number* $2n = 26$ (*Goldblatt 229* as *H. angusta, 4937, 5754*).

Flowering time: July—early October.

Distribution: clay slopes and flats, from the Richtersveld in the north, along the west coast, the interior south west Cape and western Karoo extending east through the Little Karoo to the eastern Cape at East London. Fig. 23.

Hesperantha bachmannii is a fairly common species in dry marginal habitats in the Cape Floristic Region, and the adjacent western Karoo, but its entire range is much wider. It reaches as far north as the arid Richtersveld in northern Namaqualand, and as far east as East London, where it occurs in more equable habitats such as river banks and forest margins. This considerable diversity of habitat is unusual and, surprisingly, is not reflected in any morphological pattern of variation. The species is very uniform over its range, although in very dry seasons poor growth often results in the development of dwarfed plants. The flowers are attractive when open, in late afternoon, when they have a strong sweet scent.

Hesperantha bachmannii is very closely related to *H. bulbifera*, a species that has been recorded in isolated places in eastern southern Africa, typically on steep rocky slopes or cliffs in damp situations. Morphologically the flowers of the two species are identical and *H. bulbifera* can only be distinguished by its larger corm, the presence of cormlets in the lower axils and a general tendency for larger leaves and flowers than *H. bachmannii*. Towards the eastern end of its range in the eastern Cape, some collections of *H. bachmannii* are markedly robust, and have relatively large corms, e.g. *Sidey 1157* from East London. These plants approach *H. bulbifera* in general appearance, but they lack the large axillary cormlets characteristic of this species.

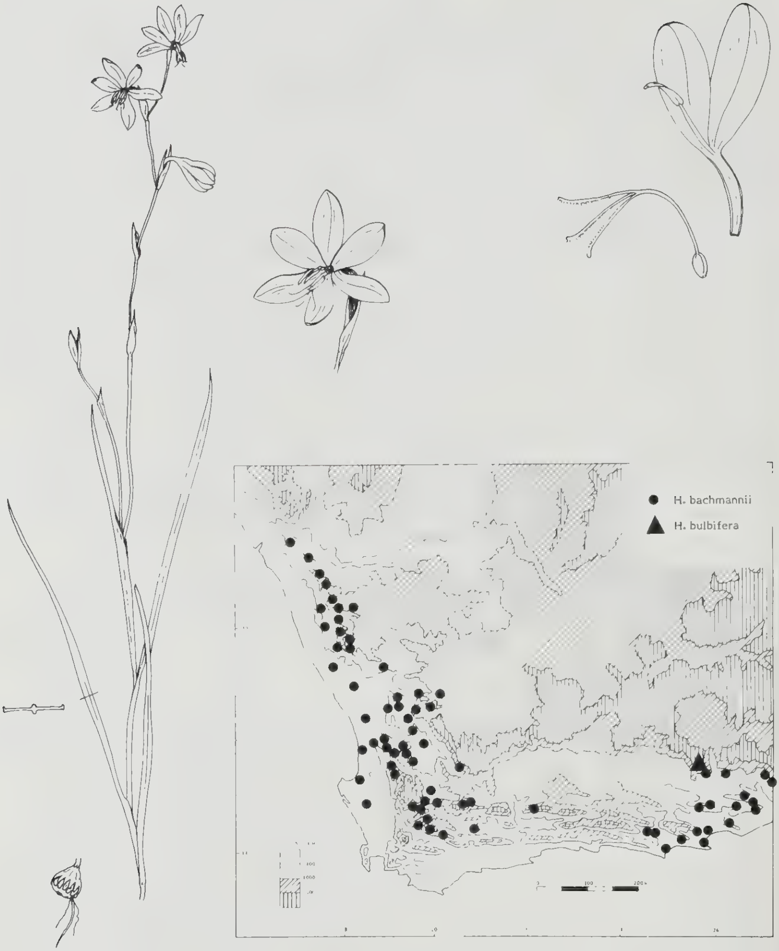


FIG. 23.
Morphology of *Hesperantha bachmannii* and distribution of *H. bachmannii* and *H. bulbifera.* A: Habit and corm × 0,5; flower life-size; gynoecium and partial flower × 2 (voucher *Goldblatt s.n.*, near Citrusdal).

Despite its small corm, *Hesperantha bachmannii* seems best placed in section *Imbricata*, for the overall corm structure is similar to other species of the section. *Hesperantha pallescens*, a local endemic of the Olifants River Mountains, has a comparable corm, and although its long-tubed flowers are very different, these two species are probably closely related within the section. *Hesperantha bachmannii* and *H. bulbifera* are unusual in section *Imbricata*, in having a recurved perianth tube. A curved perianth tube occurs elsewhere in the genus only in section *Radiata*.

Hesperantha bachmannii has long been known by the name *H. angusta*, under which name it was treated by Baker (1896) in *Flora Capensis*. It is still so named today in many herbaria, despite Foster's (1948) correct interpretation of the type of *H. angusta* as being quite different from the many collections given this name. *Hesperantha angusta* is a combination based on *Ixia angusta* Jacq. (Icones 2: tab 279, in text) and earlier named *I. linearis* by Jacquin in the *Collecteana* vol. 4 (1790) and under the figure 279 in the Icones. The original name was changed because it was a homonym for *I. linearis* L.f. (= *Gladiolus quadrangularis* (de la Roche) Barnard). *Ixia angusta* must be typified by the figure cited above, since no preserved material exists today. Careful examination of this illustration makes the conclusion seem likely that *I. angusta* is conspecific with *H. falcata*. As early as 1827 Ker (1827: 90) realised that *I. angusta* differed from *H. bachmannii*, for which he used the name *H. virginea* Banks nomen nudum, but he treated *H. angusta* as a synonym of *H. radiata*. This was later restated by Foster (1948) who used the name *H. bachmannii* for the species, the only available synonym. Reasons for regarding *H. angusta* as conspecific with *H. falcata* are discussed under the latter species.

SOUTH AFRICA, CAPE—2816 (Oranjemund): Hottentotparadysberg, top of Helskloof (-BD), *Thompson & Le Roux 103* (K, MO, STE, PRE).
—2817 (Vioolsdrif): S of Van Zylsrus, S slopes (-CB), *Thompson & Le Roux 312* (K, MO, STE, PRE); Kubus, main kloof (-AC), *Marloth 12369* (B, PRE, STE).
—2917 (Springbok): Klipfontein (-BA), *H. Bolus s.n.* (Herb. Norm. Austr. Afr. *693*) (BOL, G, GRA, P, SAM, UPS), *Grant 4844* (LMA, MO); Steinkopf (-BD), *Lewis 5514*, *5498* (NBG), *Herre s.n.* (STE *18793*); Steinkopfberge, *Herre s.n.* (STE *11825*); Spektakel (-DA), *Esterhuysen 5731* (BOL, PRE), *Barker 1482* (NBG), *Compton et al. 443/41* (NBG); Near Springbok (-DB), *L. Bolus s.n.* (BOL *31518*), *Acocks 16492* (PRE, K, UPS); Near Okiep, *Morris s.n.* (BOL *5787*, K); Wildeperdehoek Pass, S facing slopes (-DC), *Goldblatt 5754* (B, E, MO, PRE, S, US, WAG); Mesklip (-DD), *Compton 5416* (NBG).
—2918 (Gamoep): 15 miles NE of Springbok (-CA), *Compton 22029* (MO, NBG).
—3017 (Hondeklipbaai): Bowesdorp (-BB), *Stokoe s.n.* (SAM); Bowesdorp valley north of Kamieskroon, *Goldblatt 5705* (MO); Karkams (-BD), *Pearson 6533* (BOL), *6561* (K); 16 miles SW of Garies (-DB), *Hall 3762* (M, NBG, PRE, STE).
—3018 (Kamiesberg): Leliefontein (-AC), *Rodin 1471* (BOL, K, UC); Kamiesberg, *Pearson 6666* (B, BOL, K, SAM); Kamiesberg, near Welkom, 3500 ft, *Goldblatt*

4318 (MO); 28,1 miles from Garies to Leliefontein, *Thompson 437* (PRE, STE); Bitterfontein, Stinkfontein (-CC), *Pearson 6562* (B); 10 km N of Bitterfontein, *Nordenstam 1822* (S); Langebergen, summit (-DD), *Marloth 12907* (PRE).

—3118 (Van Rhynsdorp): Farm Liebendal, 10 km N of Vredendal (-CB), *Hall 4982* (NBG, PRE); Koudeberg (-DC), *Schlechter 8726* (B, BOL, G, GRA, K, L, MO, PH, PRE, S, US, Z).

—3119 (Calvinia): Brandkop, Nieuwoudtville–Loeriesfontein (-AA), *Stokoe s.n.* (SAM *55620*); Nieuwoudtville (-AC), *Grant & Theiler 4872A* (BOL), *Leipoldt 815* (K); Klipkoppies, Nieuwoudtville, *Nordenstam 2999* (M, S), *Barker 9378* (NBG); Graskop road, near Buhr's house, *L. Bolus s.n.* (BOL *19591*, K, PRE); Van Rhyns Pass, *Goldblatt 130* (J); Oorlogskloof–Papkuilsfontein, *Leipoldt 3034* (BOL); Melkbosfontein, 20 km E of Nieuwoudtville (-AD), *Thompson 2896* (STE); 14 km from Calvinia on Loeriesfontein road (-BC), *Goldblatt 3939* (B, C, MO, US); Lokenburg (-CA), *Acocks 20605* (K, M, PRE); 26 miles NE of Calvinia, Moordenaarspoort (-BD), *Lewis 2642* (SAM); Akkerdam, Calvinia, *Lewis 5180* (NBG, S), *Acocks 18628* (B, BOL, K, PRE), *18497* (PRE); W slopes of Hantamsberg, *Diels 739* (B); Calvinia, northern hills, *Marloth 10431* (PRE); Hantamsgebirge, *Meyer 16* (B); 1 mile SW of Doorn R., on Calvinia road (-CC), *Lewis 2283* (SAM); Doornbosch, *Barker 1481* (NBG); Foot of Botterkloof (-CD), *Compton 20923* (NBG); 17 miles N of Botterkloof (-DB), *Johnson 564* (BOL, NBG).

—3218 (Clanwilliam): Lambert's Bay (-AB), *Marloth 11660* (STE); Clanwilliam (-BB), *Loubser 941* (NBG), *Salter 2736* (K), *3681* (K); Olifants R., Clanwilliam, *Ecklon & Zeyher Irid. 231* (B, G, LD, MO); Stony slopes E of Clanwilliam, *Diels 291* (B); Bulshoek–Nardouwskloof, along river, *Goldblatt 3835* (E, M, MO, S, WAG); Foot of Mt. Synnot, along Bulshoek Dam, *Mauve & Oliver 113* (STE); 10 miles N of Clanwilliam, *Leighton 1383* (BOL, PRE); Near Velddrif (-CC), *Barker 5809* (MO, NBG, UC); 6 miles N of Citrusdal (-DB), *Martin 818* (NBG); Aggenbachsberg, SW of Clanwilliam, *Mauve & Oliver 20* (STE).

—3219 (Wuppertal): Bidouw Mts. (-AA), *Compton 20919* (NBG); Bottom of Bidouw Pass, *Mauve & Oliver 88* (K, MO, PRE, S, STE), *Thompson 399* (PRE); Bidouw, *Van Breda 4277* (MO); Roadside at entrance to Wuppertal lands, *Goldblatt 2532* (C, M, MO, NBG, PRE); Slopes above Welbedacht (-AC), *Lewis 5224* (SAM, STE); Wuppertal, *Lewis 5458* (NBG, S), *White 5390* (PRE); S Cedarberg, near Bushman paintings (-AD), *Goldblatt 229* (BOL); Matjiesrivier (-BC), *Wagener 143* (NBG); 5 miles N of Citrusdal (-CA), *Compton 17136* (BOL, NBG); 2 miles N of Citrusdal, *Lewis 1354* (SAM); 10 km N of Citrusdal, *Thompson 2794* (PRE).

—3220 (Sutherland): Verlaten Kloof (-BA), *Wall 42* (S); Foothills of Verlaten Kloof, *Marloth 9625* (PRE).

—3225 (Somerset East): Near Somerset East (-DA), *MacOwan 3456* (SAM); Foot of the Boschberg, *MacOwan s.n.* (BOL *1485*), *3456* (WU).

—3226 (Fort Beaufort): Bedford (-CA), *Mansell Weale s.n.* (GRA).

—3227 (Stutterheim): Boma Pass, 4 miles SW of Keiskammahoek (-CA), *Story 3547* (K, PRE); King William's Town (-CD), *Sim 19893* (PRE).

—3318 (Cape Town): Zwartland near Hopefield (-AB), *Bachmann 1177* (B, G, Z).

—3319 (Worcester): Gydouw (-AB), *Leipoldt 3033* (BOL); Titus R. valley, E of Eselsfontein (-AD), *Oliver 5093* (K, MO, PRE, STE); Hottentotskloof (-BA), *Acocks 1633* (S); Karoopoort, *Hafström & Acocks 302* (S); Zwartkoppies, Spes Bona (-BB), *Marloth 10470* (B, PRE); Bonteberg, Ceres distr. (-BD), *Compton 3781* (BOL, NBG); Karoo Garden, Worcester (-CB), *Bayer 251* (NBG), *Oliver 283* (PRE); Hexrivierskloof (-DA), *Drège s.n.* (K, S); Rabiesberg slopes, *Lewis s.n.* (BOL *31519*).

—3320 (Montagu): Whitehill, under bushes (-BA), *Compton s.n.* (SAM); Whitehill

Ridge, S side, *Compton 5621* (NBG); Near Matjiesfontein, *Marloth 9577* (PRE); Montagu Baths (-CC), *Page s.n.* (J); Kiesiesberg, Montagu distr. (-DB), *Lewis 1598* (PRE, SAM).
—3322 (Oudtshoorn): Swartberg Mts., near Kliphuisvlei on the road to The Hell, shale band, 1 450 m (-AC), *Vlok 715* (MO, NBG, SAAS).
—3324 (Steytlerville): Near Patensie, Beans Bush (-DB), *Bayliss 6034* (MO); Klipfontein, near Andrieskraal (-DC), *Bayliss 6917* (K, MO); 5,5 km N of Hankey (-DD), *Goldblatt 4937* (MO, US, WAG); Zuurbron–Gamtoos R., *Fourcade 3987* (BOL, K, STE); Klein River, Hankey, *Long 1347* (K, PRE); Hankey, beyond Bosch's farm, *Fourcade 5388* (BOL, STE).
—3325 (Port Elizabeth): Ripon (-BB), *Smith s.n.* (GRA, PRE *36345*); Top of Zuurberg Pass (-BC), *Bayliss 5876* (K, MO); Enon, *Thode A2762* (K, PRE); Uitenhage distr. (-C), *Ecklon & Zeyher s.n.* (SAM *20816*); Loerie R. (-CC), *J. L. Drège 205* (GRA); Van Staden's, *Paterson 73* (GRA); Uitenhage (-CD), *Loubser 902* (NBG); 2 miles S of Addo's Drift (-DB), *Fries, Norlindh & Weimarck 1214* (LD); Redhouse (-DC), *Fries, Norlindh & Weimarck 544* (K, LD, PRE, SAM), *498* (LD), *west 113* (GRA, K), *Long 1073* (K, PRE), *Rogers 3637* (PRE); Near Port Elizabeth, *Smith s.n.* (BOL *12982*), *Hallack* sub *Galpin 3069* (PRE); Aloes, *Drège s.n.* (PRE *8041*).
—3326 (Grahamstown): Near Middleton (-AB), *Rogers s.n.* (BOL *12982*); Pluto's Vale (-BA), *Sampson s.n.* (GRA); Ecca Pass near Bothasberg, *MacOwan 345* (GRA, K); Grahamstown (-BC), *Rogers 1166* (BOL); Dassieklip, Albany (-CA), *Archibald 5290* (BOL); Alexandria, Sandflats (-CB), *Rogers 2226* (GRA).
—3327 (East London): River banks, East London distr. (-BB), *Sidey 1157* (MO); Forest edge, Buffalo Pass, *Batten s.n.* (NBG).
—3424 (Humansdorp): Duineveld E of Kromme R. mouth (-BB), *Fourcade 2777* (BOL).

Without precise locality: Little Namaqualand, *Scully 108* (STE, Z); *Ecklon & Zeyher 76.8* (L, Z); *Verreaux 293* (G); Eastern frontier, *Hutton s.n.* (K); Rock ledges along banks of Gt. Fish River, *MacOwan 345* (BOL, G, K).

23. **Hesperantha bulbifera** Baker, J. Bot. **14**: 183. 1876 et Flora Cap **6**: 65. 1896; Foster, Contr. Gray Herb. **166**: 8. 1948. Type: S. Africa, Cape, Boschberg, Somerset East, *MacOwan 2215* (K, lectotype here designated; BOL, G, K, PRE, WU, isolectotypes).

Hesperantha sabiensis N.E. Br. ex Foster, Contr. Gray Herb. **166**: 23. 1948. Type: S. Africa, Transvaal, Sabie, *Cunliffe s.n.* sub *Moss 4311* (K, lectotype here designated; PRE, Z, isolectotypes).

Plants 200–300 mm long, usually trailing. *Corm* globose, 8–10 mm in diameter, base oblique, with a small downward projection; tunics dark brown, woody, entire above, notched below into segments, with tunics of previous years smaller, and accumulating in overlapping layers above. *Cataphylls* dry, membranous, 1–2. *Leaves* 3–5, linear to slightly falcate, flat, very thin-textured, about as long as the plant, 3–7 mm wide. *Stem* growing on steep slopes or cliffs, trailing, simple or with a branch produced from axil of a cauline leaf, bearing bulbils in all or many leaf axils. *Spike* slightly flexuose, 2–6-flowered; *bracts* herbaceous with a hyaline margin, outer 15–25(–30) mm long, acute, inner shorter, obscurely notched at apex. *Flow-*

er white (–cream), facing downwards, usually opening in late afternoon and sweet-scented; *perianth tube* 9–15 mm long, recurved, shorter than bracts, and emerging between them; *tepals* subequal, outspread when open, 16–20 mm long, elliptic, 5–8 mm at widest, obtuse. *Filaments* 6–7 mm long; *anthers* ca. 8 mm, articulated and usually pendent. Ovary 3–4 mm long, style branches ca. 14 mm, pendent, reaching to near apex of anthers. *Capsule* ovoid, 7–8 mm long. *Chromosome number* not known.

Flowering time: September–October in the Boschberg, May–July in Transvaal localities.

Distribution: moist, shady, montane habitats, on steep slopes or on cliffs, recorded from isolated localities, the Boschberg near Somerset East in the eastern Karoo, and in the Transvaal, on the Blaauwberg, on Kranzberg (Thabazimbi), and along the Drakensberg escarpment at Sabie and Mt. Sheba. Fig. 23.

Hesperantha bulbifera is closely allied to the widespread south western Cape–Namaqualand species *H. bachmannii*. Superficially the two species seem almost identical, except that *H. bulbifera* bears single, quite large cormlets along the stem in the axils of all or most of its leaves. In floral characteristics they share a strikingly similar series of features including a curved tepal tube emerging between the bracts, downward-facing flowers, pendulous anthers and similar long, narrow herbaceous bracts. Differences seem minor by comparison apart from the cormiferous condition in *H. bulbifera*, and include a generally more leafy habit, larger corms and flowers which, while similar to those of *H. bachmannii*, are consistently larger in all respects, falling in the upper range of the latter species.

They differ markedly in their habitats: *Hesperantha bulbifera* grows in damp shady situations on steep montain slopes or on cliffs near running water. *Hesperantha bachmannii* by contrast grows in dry habitats in stony or sandy soils with its corms only shallowly buried in the ground.

Hesperantha bulbifera has an unusual, perhaps unique distribution range, and certainly so for Iridaceae. The type locality, and southernmost known station is the waterfall on the Boschberg near Somerset East in the eastern Karoo, a mountain complex in this semi-arid area. The four other records are far to the north in the Transvaal, also in montane situations, and populations here are reported as blooming from May to July, late autumn and winter, in contrast to spring on the Boschberg. It seems likely that further populations will be discovered when suitable habitats are investigated.

SOUTH AFRICA, TRANSVAAL—2328 (Addney): Top of Blaauwberg, above farm In der Mark, seepage areas in vertical cliffs (-BB), *Venter 6188* (PRE).

—2427 (Thabazimbi): Slopes of Kranzberg, foot of cliffs (-BC), *Venter 1936* (PRE); Kranzberg, high slopes, *Germishuizen 243* (K, MO, PRE).
—2430 (Pilgrim's Rest): Mt. Sheba Nature Reserve, crevices in rock ledges on cliffs (-DC), *Kerfoot 8369* (J, MO, PRE).
—2530 (Lydenberg): Sabie (-BB), *Cunliffe* sub *Moss 4311* (K, Z).
CAPE—3225 (Somerset East): Waterfall on Boschberg, in crevices in cliffs (-DA), *MacOwan 2215* (BOL, G, K, PRE, WU).

Section HESPERANTHA

3. Section **Hesperantha**, Ann. Missouri Bot. Gard. **69**: 377. 1982.

Corm ± symmetric, with a flat base, and campanulate to triangular in outline, tunics imbricate, outer covering inner above only, lower margins entire, or serrate or drawn into spines, sometimes notched below into ± even-sized sections. *Flower* actinomorphic, usually whitish, yellow, or pink to purplish, occasionally with darker markings (in *H. luticola*); tube barely to well-exserted from bracts; anthers and style branches included in perianth tube in *H. cedarmontana*. Plants acaulescent in *H. luticola*, and usually so in *H. latifolia.*

Distribution: restricted to the winter rainfall area, from Port Elizabeth to the Cape Peninsula and north to the Richtersveld.

Species: 7.

Type species: H. falcata (L.f.) Ker

Section *Hesperantha* comprising seven species, is restricted to the winter rainfall areas of the south western Cape, Namaqualand and the western Karoo. All species have flat-sided corms, campanulate to triangular in outline, often with toothed or spiny margins. Two species, *H. latifolia* and *H. luticola*, are acaulescent and grow in seasonally moist sites such as rock pools and stream edges. Both have long perianth tubes. Other species have fairly small, relatively short-tubed flowers, but *H. cedarmontana* is unusual in having included stamens and a very short style and style branches enclosed in the perianth tube. *Hesperantha spicata* and the very localised *H. saldanhae* usually have a large number of very small flowers per spike. *Hesperantha spicata* subsp. *spicata* often has leaves with undulate margins, while subsp. *fistulosa* has hollow, terete leaves. *Hesperantha falcata* is the only widespread species, and is very variable. Its flowers may be white or occasionally yellow or cream. While pale-coloured flowers are the rule in section *Hesperantha, H. pauciflora* and *H. latifolia* have pink to deep purple flowers.

24. **Hesperantha falcata** (L.f.) Ker, Konig & Sims Ann. Bot. **1**: 225. 1805; Baker, Handbk. Irid. 148. 1892 et Flora Cap. **6**: 58. 1896. **Fig. 24.**

Ixia falcata L.f., Suppl. Pl. 92. 1782. Type: South Africa, Cape, hills around Cape Town, *Thunberg s.n.* (Herb. Thunb. 952β, UPS, lectotype here designated); syntypes *953α*, *955γ* and *956δ* [= *Geissorhiza imbricata* (de la Roche) Ker].

Hesperantha angusta (Jacq.) Ker, Konig & Sims Ann. Bot. **1**: 225. 1805; non sensu Baker, Handbk. Irid. 152. 1892 et Flora Cap. **6**: 65. 1896.

Ixia angusta Jacq., Ic. Pl. Rar. **2**: 7 (in conspectus tabularum, non sub tabulum) 1793, nom. nov. pro *Ixia linearis* Jacq. hom. illeg.

Ixia linearis Jacq., Coll. Bot. **4**: 1790, et Ic. Pl. Rar. 2: tab. 279. 1793/4. hom. illeg. non *I. linearis* L.f., 1782 [= *Gladiolus quadrangulus* (de la Roche) Barnard]. Type: South Africa, Cape, without precise locality, figure in Jacq., Ic. Pl. Rar. 2: tab. 279 (lectotype).

Hesperantha linearis Fourc., Trans. Roy. Soc. S. Africa **21**: 77. 1934, intended as a new combination, but treated here as nom. nov. pro *I. linearis* Jacq. hom. illeg.

Hesperantha lutea Eckl. ex Baker, Handbk. Irid. 149. 1892 et Flora Cap. **6**: 60. 1896; Foster, Contr. Gray Herb. **166**: 20. 1948. Type: S. Africa, Cape, Caledon distr., *Zeyher s.n.* (K, holotype) [specimens of *Ecklon & Zeyher Irid. 216* (B, G, L, LD, MO) and *Ecklon & Zeyher s.n.* (51.9) (B, C, E, GH, LD, PRE, UPS, UW, Z) from Caledon Zwartberg near the Baths, are probably isotypes].

Hesperantha lutea var. *luculenta* Foster, Contr. Gray Herb. **166**: 19–20. 1948. Type: South Africa, Cape, hills at Berg River bridge, Piketberg, *Schlechter 5261* [GH, holotype (not seen); B, BOL, G, K, P, PRE, S, Z, isotypes].

Geissorhiza pauciflora Baker, Bull. Herb. Boiss. ser. 2, **4**: 1004. 1904; Foster, Contr. Gray Herb. **166**: 21. 1948, in synon. sub *H. pentheri*. Type: South Africa, Cape, near Porterville, *Schlechter 4891* (K, lectotype here designated; B, BOL, G, W, Z, isolectotypes).

Hesperantha insipida Lewis, Jl S. Afr. Bot. **7**: 56. 1941 as nom. nov. pro *Geissorhiza pauciflora* (*H. pauciflora* Lewis bars combination in *Hesperantha*).

Hesperantha pentheri Baker, Kew Bull. **1906**: 26; Foster, Contr. Gray Herb. **166**: 21–22. 1948. Types: South Africa, Cape, Olifants R., Clanwilliam Div., *Penther 686* (K, lectotype effectively designated by Foster, 1948); *Penther 625* (? K, not seen, syntype).

Hesperantha trifolia Foster, Contr. Gray Herb. **166**: 26. 1948. Type: South Africa, Cape, Bull Hoek, *Schlechter 8378* (B, holotype; BOL, G, K, MO, PH, P, PRE, US, Z, isotypes).

Hesperantha maritima Eckl., (*Ecklon & Zeyher Irid. 298*) ms. et Top. Verz. 23. 1827. nom nud.

Hesperantha pallida Eckl., (*Ecklon & Zeyher Irid. 236*) ms. et Top. Verz. 23. 1827. nom nud.

Hesperantha collina Schltr. ms. (*Schlechter 10742*).

Plants 60–200(–300) mm high. *Corm* ± symmetric, (5–)8–15 mm in diameter at base, campanulate to triangular in outline, with flat base, tunics imbricate, dark brown to black, older layers accumulating above, breaking into segments below, lower margin often with radiating spines or teeth. *Cataphyll* dry, solitary, membranous, sometimes evidently lacking. *Leaves* 3–4(5), all basal or upper inserted near stem base, (20–)50–80(–150) mm long, falcate or erect and ensiform, sometimes obtuse at apex (2–)4–8 mm wide, uppermost or upper two leaves sheathing lower part of stem (occasionally fifth leaf may be bract-like), margin sometimes slightly thickened and hyaline. *Stem* erect, single or 2–3-branched from near base, occasionally also from axil of uppermost leaf. *Spike* (1–)3–8-flowered; *bracts* herbaceous, often reddish and becoming dry at apices, 6–13(–15) mm long; inner narrower, sometimes slightly shorter. *Flower* hypocrateriform, white, pale to deep yellow or rarely cream, outer tepals flushed red, pink or brown on reverse, white forms opening towards 17h00 and then scented, closing towards dawn, yellow forms scentless and day-blooming; *perianth tube* cylindric, 4–9 mm long; *tepals*, subequal, (9–)12–18 mm long, narrowly ovate to elliptic, 5–7 mm at widest point. *Filaments* 3–4 mm long; *anthers* (3–)4–7,5 mm long. Ovary 2–3 mm long, style branches 6 mm long. *Capsule* obovoid, 7–10 mm long, somewhat shorter to slightly exceeding bracts. *Chromosome number* 2*n* = 26 (*Goldblatt s.n.* no voucher – Malmesbury commonage; *Goldblatt 4763, 4756, 5644, 149, 4847*).

Flowering time: August–September (late July in the north–early October in the south).

Distribution: throughout the Cape Floristic Region, from Lokenburg in the north to Port Elizabeth in the east; on various soils from heavy clay to coarse sand. Fig. 24.

Hesperantha falcata is one of the more widespread of the species of *Hesperantha* of the winter rainfall region. It is restricted to the Cape Floristic Region, and occurs almost throughout this area, with the exception of the northern half of the Nieuwoudtville escarpment and drier areas of the west and south coasts. It is similar to several other species in its moderate-sized and usually white flower with dark reddish pigmentation on the reverse of the outer tepals, but it is distinctive in its leaves and corms. The fairly broad leaves are usually falcate and when dry have a fine parallel venation pattern. The corm is campanulate to triangular in outline and the lower margins of the imbricate tunics are lightly to strongly serrate or spinose. In the absence

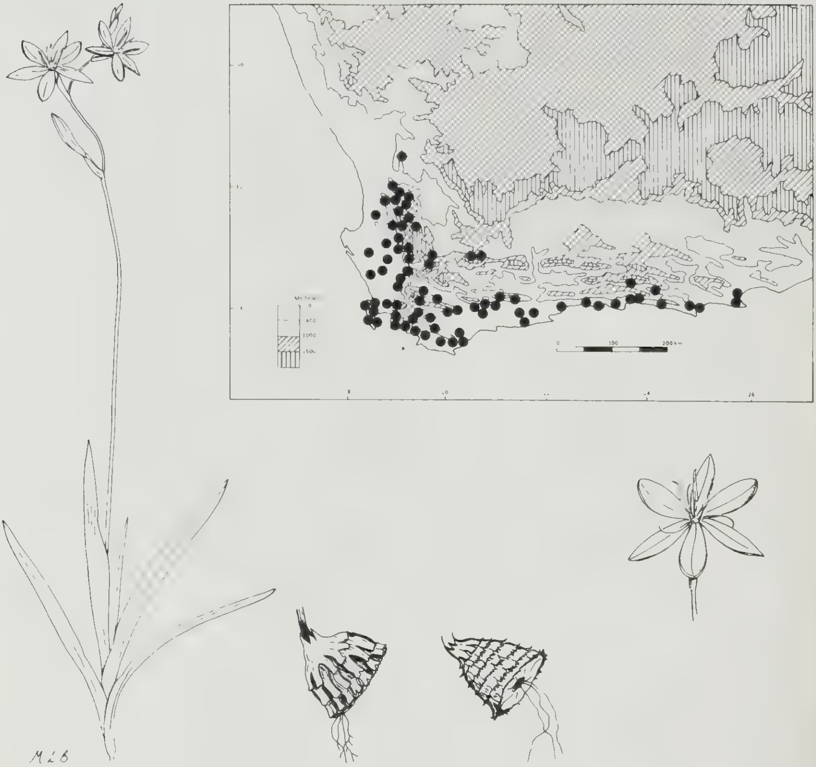


FIG. 24.
Morphology and distribution of *Hesperantha falcata.* Habit × 0,5; flower and corms life-size (vouchers: *Goldblatt s.n.* no voucher, Kirstenbosch Gardens; corm lower left *Goldblatt 5644* below Piekeniers Kloof Pass; corm lower right *Goldblatt 5199*, Keurbooms River).

of corms *H. falcata* is easily confused with *H. cucullata* and broader-leafed specimens of *H. acuta,* both of which have almost identical flowers.

Hesperantha falcata is normally an outcrossing species, but several accessions have been observed to be facultatively autogamous in the greenhouse, where many flowers on a spike will set fruit by their own pollen. These capsules usually contain a reduced number of fertile seeds. A small-flowered form from the southern Cape appears to be completely autogamous, setting full capsules in the greenhouse with its own pollen.

The species was one of the first members of the genus to be described. It was collected by Thunberg in the 1770's and was described, as *Ixia falcata*, by the younger Linnaeus in 1782. I have selected *Hesperantha falcata* as type species of the genus.

Hesperantha angusta (basionym *Ixia angusta* Jacq., 1793) is probably an early synonym, although the name *H. angusta* has sometimes been applied to *H. bachmannii* (e.g. Baker, 1896) (see discussion under that species). The type figure of *I. angusta* has a flat based campanulate corm like that of *H. falcata,* narrow and possibly somewhat fleshy falcate leaves and white flowers with a more or less straight perianth tube. The figure is too poor for definitive identification, but it seems closest to *H. falcata*.

Hesperantha falcata is one of the most variable species in the genus and as treated here, comprises a range of forms placed by Baker (1896; 1904) and by Foster (1948) in as many as six separate taxa. These are in addition to *H. falcata* sensu stricto: *H. lutea* Ecklon ex Baker; *Geissorhiza pauciflora* Baker, which is *H. insipida* Lewis (a required nomen novum since *H. pauciflora* is preoccupied); *H. pentheri* Baker (in which Foster included *H. insipida*); *H. trifolia* Foster; and *H. lutea* var. *luculenta* Foster. All these names (excepting *H. insipida*, which seems indistinguishable from *H. pentheri*) do represent distinct forms of *H. falcata* but they differ in relatively insignificant ways from one another. They also do not comprise the entire range of variation in the complex in which other notable variants are: a marsh form with very long, erect leaves; a southern Cape form with small and often very few flowers; and populations from the Witteberg area which comprise short plants having leathery leaves with distinctly thickened margins.

The form called *Hesperantha lutea* has deep yellow flowers, but differs in no other morphological feature from typical *H. falcata.* It occurs in the southern Cape from Caledon in the west to George in the east, usually on clay soils and in drier sites in renosterbos vegetation. Its flowers bloom during the day, opening at midday and closing in the late afternoon in contrast with typical *H. falcata,* which is evening-blooming, and occurs on generally moister sites either on clay or more often on sandy soil.

Hesperantha lutea var. *luculenta* is another colour form of *H. falcata*, but probably not related directly to *H. lutea.* It has pale yellow flowers and also occurs on clay soils, but is restricted to shale flats in the Swartland on the plains between Piketberg and Porterville. The flowers are a much paler yellow than those of *H. lutea*.

Hesperanta pentheri and *H. insipida* represent a form with even paler yellow flowers, perhaps better described as cream or ivory. Plants matching their types occur to the north in the Olifants River valley and have notably narrower tepals than *H. lutea* var. *luculenta.* This form also has narrower floral bracts than are usual in *H. falcata*, but the white-flowered form of

H. falcata, also found in the Olifants River valley, has similar narrow bracts, and this form corresponds with the type of *H. trifolia.* The majority of collections of *H. falcata* from the Olifants River valley and adjacent areas have three leaves, both white and cream-flowered forms, in contrast to forms *H. falcata* occurring to the south in the rest of its range. Occasionally, however, populations of robust individuals comprise plants with four or even five leaves, although their flowers correspond exactly with populations having consistently three leaves (*Ecklon & Zeyher Irid. 234; Goldblatt 3868, 5657*).

The smallest and most dwarf specimens of *Hesperantha falcata* occur in the most northern part of its range, in the lower Olifants River valley, and in some of the drier valleys and mountains nearby. Here the climate of the Cape Region is most extreme, with low and unpredictable rainfall, and the variability is undoubtedly a result of climatic variation from year to year and place to place. The dwarf form is very like *H. trifolia* in its flower and seems to represent merely a depauperate growth form of this genotype.

Besides the several forms described above, there are three more that need be mentioned. One is a narrow and erect-leafed plant which grows in wet, even marshy, sites in the south western and southern Cape (e.g. *Lewis & Davis 2230; Baker 2492*). The second is a small-flowered form from the eastern end of the range of the species (*Fourcade 3362; Goldblatt 4922*) in which the flowers have a tube 5 mm long, and tepals 9–11 mm long. The third comprises plants that are often small (ca. 100 mm tall) and always with short and rather leathery leaves (30–40 mm long) the margins and midrib of which tend to be thickened (*Compton 12242; Barker 3034; Compton 16269; Leighton 221*). These occur on the Witteberg and adjacent mountain areas.

This variation pattern is more complex than that found in most species of the genus and it is difficult and perhaps even unnecessary to devise an acceptable taxonomy to reflect the situation. Each form is connected to some extent with others through intermediates and it is sometimes difficult to distinguish one from another, so that specific recognition of any seems unwarranted. Infraspecific recognition of any form would, for the sake of consistency, seem to require recognition of several others. The admission of subspecies based solely on colour differences is unsatisfactory and thus *H. lutea, H. lutea* var. *luculenta* and *H. pentheri* are reduced to synonymy.

The southern Cape small-flowered form, and the long-leafed marsh form seem to be no more than ecotypes and do not merit taxonomic recognition as such. This leaves only the west coast and Olifants River populations. These seem intuitively more distinct than other variants in their frequent possession of three leaves, narrow and attenuate floral bracts and often quite large flowers, but careful examination of all the material at my disposal suggests that it would be of little value to accord even these populations any formal taxonomic status. The characters that distinguish them occur in populations in other parts of the range of *H. falcata* although less commonly than in the Olifants River valley.

This treatment accords no formal recognition to the various colour forms but those requiring a name for the three distinct flower colour races should follow Burtt's (1970) suggestion of the use of an infraspecific epithet without denoting rank—essentially a trinominal—thus *Hesperantha falcata (lutea)* or *H. falcata (luculenta)* etc. My treatment may seem arbitrary, but my decision has been influenced by my field experience as much as by herbarium material. In the field *H. falcata* and *H. trifolia* seem much less distinct than in the herbarium, while the flower colour races seem rather more distinct when seen alive, when colour seems overly significant. This treatment of *H. falcata* accords with that for *H. pilosa* and *H. acuta* in which colour forms are also given no taxonomic recognition.

In the listing of exsiccatae that follows, all yellow-flowered forms have been highlighted with an asterisk.

SOUTH AFRICA, CAPE—3118 (Vanrhynsdorp): Top of Nardouw Pass (-DC), *Goldblatt 6163* (MO); Olifants R. Barrage (-DD), *Compton 11050* (NBG), *Esterhuysen 5377* (BOL); Bulhoek, *Wall 42* (LD); Bullhoek, *Schlechter 8378* (B, BOL, G, K, MO, PH, US, Z).

—3119 (Calvinia): Lokenburg (-CA), *Puff 80/0901* (MO), *Leistner 308* (PRE).

—3218 (Clanwilliam): Rietvleiberg (-BA), *Oliver 3831* (K, PRE, STE); Clanwilliam (-BB), *Compton 10993* (NBG), *Schlechter 8589* (B, PRE); am Fluss Olifantrivier und bei Villa Brakfontein, *Ecklon & Zeyher Irid. 234 (76. 9)* (MO, SAM), **Ecklon & Zeyher Irid. 212 (76)* (B, G, MO, SAM); Between Nardouws Kloof and Bulshoek, *Goldblatt 3839* (MO); Clanwilliam–Graafwater, near Olifants R. bridge, **Salter 3538* (BOL, K); Boschkloof, *Schlechter 8459* (B, BOL, G, K, PH, PRE, W, Z); Verlorenvlei (?-BC), *Barker 2613* (BOL, NBG); Between Alpha and Rondegat (-BD), *Goldblatt 6150* (MO, US, WAG); Near Rondegat, **Goldblatt 2187* (M, MO, NBG); 10 miles S of Clanwilliam, *Lewis & Davis 2496* (SAM); The Rest, below Piekeniers Kloof (-DB), *Gillett 3707* (BOL, STE), *Goldblatt 5644* (MO); Slopes above Berg River at bridge near Piketberg (-DC), **Schlechter 5261* (B, BOL, C, G, K, PRE, S, UPS, Z), **L. Bolus & Lewis s.n.* (Nat. Bot. Gard. *1825/32* in BOL, K).

—3219 (Wuppertal): Citadelkop (-AA), *Compton 24241* (NBG); Bidouw Valley, *Goldblatt 6161* (MO); Near top of Pakhuis Pass, *Goldblatt 6399* (MO, UC); Pakhuis Pass west of Leipoldt's Grave, *Goldblatt 6402* (MO); Lammkraal, *Schlechter 10850* (B, BOL, G, K, MO, PH, PRE, US, Z); Bidouw, Pass into valley, *Thompson 338* (PRE); Between Clanwilliam and Algeria, S slopes (-AC), *Goldblatt 3868* (M, MO, S, WAG); Shale hillside E of Citrusdal (-CA), **Goldblatt 6144* (MO, PRE, WAG); Elandskloof, *Esterhuysen 3160* (BOL, PRE), *Compton 9671* (NBG), *16238* (NBG), *Oliver 4019* (K, PRE, STE), *Lewis s.n.* (BOL); Citrusdal, *Martin 814* (NBG, STE) *Lindeberg s.n.* (S); Cold Bokkeveld, Waboomsrivier-Yzerfontein (-CC), *Lewis 2645* (SAM).

—3318 (Cape Town): Near Hopefield (-AB), *Bachmann 222* (B); Leliefontein, near Hopefield, *Bachmann 1173* (B, Z); Darling (-AD), *Rogers 14001* (PRE), *Bachmann 514* (B, Z); Clay hills, Darling, *H. Bolus s.n.* (BOL *12839*); Klipkop, Darling, *Bachmann 1174* (B, Z); Mamre hills, *Barker 1812* (NBG); Porterville (-BB), **Loubser*

462 (NBG), **Schlechter 4891* (B, BOL, G, K, W, Z), *2570* (PRE); Malmesbury common (-BC), *Salter 8438* (SAM); Riebeek Kasteel (-BD), *Esterhuysen 6030* (BOL, PRE); Camps Bay (-CD), *Marloth 150* (PRE), *Zeyher 141* (SAM), *Prior s.n.* (K, Z); Lions Head, *Drège s.n.* (S), *Zeyher s.n.* (SAM *20787*), *Wilms 3704* (B); Foot of Lions Head, *Guthrie s.n.* (BOL); Lower W slope of Lion's Head, *Lewis 1076* (SAM); Signal Hill, *Wilms 3751* (B, G, PH, WU); Stinkwater, *Rehmann 1198* (Z); Kenilworth, *L. Bolus s.n.* (BOL *13945*); Cape Town, *Prior s.n.* (Z); Paarden Eiland, *Ecklon s.n.* (S); Table Mt., *Thode 9222* (STE), *Ecklon s.n.* (S), *Pappe s.n.* (S); Table Mt., lower plateau, *Lewis 972* (SAM); Foot of Window Gorge, *Stokoe 8838* (BOL); Tamboers Kloof, Cape Town, *Zeyher 5032* (SAM); N slope of Devil's Peak, *Diels 87* (B); "Bergplatze bei der Kapstadt", *Ecklon & Zeyher Irid. 298* (B, LD, MO); Klipheuwel (-DA), *Thompson 2593* (PRE); Dal Josaphat (-DB), *Grant 2337* (BOL, MO); Wellington, *Grant 2243* (MO), *Compton 11631* (M, NBG); Near Wellington, *Grant 2366* (MO, PRE); Paarl, *Story 3031* (PRE); Langverwacht, Kuils River (-DC), *Oliver 4331* (K, MO, PRE, S, STE); North of Tygerberg, *Barker 4812* (BOL, NBG), *Compton 20064* (NBG); Hasendal, Kuils River, *Rycroft 2327* (NBG); Hercules Pillar (-DD), *Compton 1163* (NBG); Blaauwklip, Stellenbosch, *Gillett 589* (BOL, STE); Stellenbosch flats, *Garside 1502* (B, K); 3 km N of Koelenhof, *Thompson 2620* (PRE, STE); Bottelary road, near Stellenbosch, damp ground, *Lewis & Davis 2230* (NBG, PRE).

—3319 (Worcester): Near waterfall, Porterville (-AA), *Edwards 36* (J); Porterville, hills, 300 m, *Schlechter 4882* (K); Saron Kloof, *Martin 1896/36* (NBG); De Hoek Estates, Saron, *Lewis s.n.* (BOL *31528*); Near Tulbagh Road turnoff, in renosterveld along national road (-AC), *Goldblatt 4756* (MO); Sandy flats at top of Tulbagh Falls, *Goldblatt 4763* (MO, WAG); Steendal, Tulbagh distr., *Drège s.n.* (SAM), *Pappe s.n.* (BOL *31534*); Bains Kloof (-CA), *Wall 42* (S), *Esterhuysen 35560* (MO); Michells Pass (-AD), *Esterhuysen 6146* (BOL); Hottentots Kloof (-BA), *Barker 1479* (NBG); Matroosberg, near Lakenvlei (-BC), *Phillips 2075* (SAM); Verkeerdevlei (-BD), *Horrocks 105* (NBG); Botha's Halt, Worcester (-CA), *Gillett 252* (BOL, STE); Brandvlei, sandy flats (-CB), *Lewis 6050* (NBG, STE); Brandvlei, 18 miles N of Villiersdorp, *Marsh 888* (PRE, STE); Hex River valley (-CC-DA), *Tyson 716* (SAM), *Davidson s.n.* (SAM *16*); 4 miles N of Villiersdorp towards Worcester (-CC), *Marsh 854A* (STE); Eendracht (-DB), *Lewis 1597* (SAM); 10 miles from MacGregor towards Bonnievale (-DD), *Marsh 805* (PRE, STE).

—3320 (Montagu): Tweedside (-AB), *Lewis s.n.* (Nat. Bot. Gard *2690/32* in BOL, K); Witteberg at Whitehill (-BC), *Compton 16269* (NBG); Witteberg at Bantams, *Compton 12242* (NBG); Witteberg, *Leighton 221* (BOL); Palmyra, Heidelberg distr. (-CC), **Loubser 2128* (NBG).

—3321 (Ladismith): Corente R. farm, Riversdale distr. (-CC), *Muir 5361* (BOL, PRE).

—3323 (Willowmore): Onder Kouga, E. Cape (-CB), *Bayliss 7154* (MO); Ruytersbos (-CC), *Van Niekerk 87* (BOL, K); Nature's Valley, forest margin (-DC), *Acocks 21499* (K, PRE).

—3324 (Steytlerville): Campanies Drift (-CC), *Fourcade 2314* (K).

—3325 (Port Elizabeth): Thornhill (-CC), *Cruden 438* (PRE); Near Bethelsdorp (-DC), *Pappe s.n.* (SAM *25200);* Port Elizabeth, *Rosenbrock 173* (B); Near Port Elizabeth, *West 64* (K); Aerodrome, Port Elizabeth, *Long 200* (K).

—3418 (Simonstown): "Clivis montis pr. Simonstown" (-AB), *Schlechter 1196* (B, BOL, G, WU, Z); Hout Bay, *Acocks 4751* (S), *Bond 438* (NBG), *Compton 11756* (BOL, NBG); Tokai, *Rogers 16173* (Z); Fish Hoek, *Wolley Dod 1416* (BOL); Olifantsbos, Cape Peninsula (-AD), *White 5527* (PRE); Isoetes Vlei (-BA), *Rowe 29* (NBG); Hottentots Holland (-BB), *Zeyher s.n.* (SAM *25199);* Sir Lowry's Pass, _Schlechter 1143_ (B, BOL, M, WU); Waterkloof, Somerset West, _Parker 3814_ (BOL, GH, K, NBG); Between Dwarsberg and Somerset Sneeuwkop, Hottentots Holland, _Stokoe s.n._ (SAM _58711_); Hangklip (-BD), _Gillett s.n._ (MO); Rooi Els, _Barker 2792_ (NBG).

—3419 (Caledon): Clay slopes east of Queen Anne (-AA), _Goldblatt 2496_ (B, MO, PRE, US, WAG); Between Eseljag and Queen Anne, _Goldblatt 4000_ (MO); Flats E of Viljoen's Pass, _Stokoe s.n._ (SAM _61732_); Caledon road, 1 mile from Villiersdorp turnoff (-AB), _Barker 7_ (BOL, K, PRE); Caledon Baths, _Guthrie 2529_ (NBG); Hill N of Baths, Caledon, _Marloth 92227_ (PRE, STE); Caledon Zwartberg and Baths, _Ecklon & Zeyher s.n._ (51.8) (PRE), _Ecklon & Zeyher Irid. 236_ (51.8) (B, LD, MO, S, SAM); Slopes of Caledon Zwartberg near Baths (-AB), *_Templeman_ sub _MacOwan 2609_ (BOL, S, SAM), *_Ecklon & Zeyher s.n._ (51.9) (B, C, E, GH, L, LD, PRE, UPS, WU, Z), *_Ecklon & Zeyher Irid. 216_ (52.8) (B, G, LD, MO); Near gates to Caledon Baths, *_Barker 12_ (K); Zwartberg, *_Atherstone 276_ (B); Burned clay slope, W end of Caledon, _Goldblatt 5790_ (MO); Kleinmond, near coast (-AC), _De Vos 1_ (B); Fern Kloof, Hermanus (-AD), _Goldblatt 5971_ (MO); Vogelklip, Hermanus, _Barker 1789_ (NBG); Vogelgat, _Williams 2585_ (PRE); Entrance to Vogelgat Reserve, _Goldblatt 4854_ (MO); Mossel River, Hermanus, _Compton 23624_ (NBG); Foot of Steenboksberg, on Stanford–Caledon road, *_Goldblatt 4097_ (MO, PRE, US, WAG); Kleinriviersberg, (-AD-BC), *_Ecklon & Zeyher Irid. 215_ (K, SAM (58.8)); Riviersondereinde (-BB), _Zeyher 3962_ (PRE, SAM); Fairfield farm (-BD), _Thompson 3218_ (K, PRE); NE of Sandy's Glen, near Fairfield, *_Goldblatt 4847_ (M, MO, S, WAG); Frikkies Bay, sand flats (-CB), _Compton 18199_ (NBG); West of Elim (-DA), _Muir 5021_ (NBG); Elim (-DB), _Frowein 16308_ (PRE).

—3420 (Bredasdorp): Grassy places between Stormsvlei and Riviersonderend (-AA), _Gillett 1139_ (STE); Bontebok Park, vlei on road to "old garden" (-AB), _Liebenberg 7399a_ (PRE, STE); Bontebok Park, SE of Swellendam, *_Liebenberg 6542_ (PRE); Dronkvlei, entrance gate (-AD), *_Burghers 2433_ (STE); Ruggens near Zuurbraak, 800 ft (-BA, -BB), *_Galpin 4683_ (BOL, K, PRE); Between Heidelberg and Zuurbraak, *_Lewis 5653_ (NBG, STE); Zuurbraak, S slopes (-BA), *_Rycroft 3124_ (NGB), *_Acocks 24140_ (K); Grootvadersbos, *_Ludwig & Beil s.n._ (S); Jantjies Bos, farm Nachtwacht, Bredasdorp (-CA), _Smith 2991_ (PRE); The Poort, Bredasdorp, _Barker 2528_ (NBG), _Barker 2492_ (NBG).

—3421 (Riverdale): Riversdale (-AB), *_Rust 28_ (B), * _Rogers 4396_ (BOL, Z); Stilbaai–Blombos road, Riversdale distr. (-AD), _Wurts 1527_ (NBG); Weltevreden, near Albertinia (-BA), *_Muir 997_ (BOL, PRE, SAM).

—3422 (Mossel Bay): Pacaltsdorp, fynbos on cliffs above the sea (-AB), *_Moriarty 585_ (NBG); Sedgefield (-BB), _Cassidy 223_ (NBG); Belvedere, Knysna, _Duthie 1141_ (BOL, STE).

—3423 (Knysna): Knysna, lawn weed (-AA), _Cassidy 226_ (NBG); Keurbooms River, sand at edge of bush near hotel (-AB), _Goldblatt 5199_ (MO); 1,6 miles W of Keurbooms R. on Plettenberg Bay road, _Mauve 4611_ (K, PRE).

—3424 (Humansdorp): Witte Els Bosch (-AA), _Fourcade 911_ (BOL); Oudebosch flats, _Fourcade 3362_ (K, MO, PRE, STE); Humansdorp (-BB), _Thode A1037_ (PRE); Hillside, Humansdorp, _Galpin 4670_ (K, PRE); 4,6 km S of Humansdorp, _Goldblatt 4922_ (MO); Seekoei River, _Montgomery 36_ (STE).

Without precise locality: C.B.S., _Bergius 478_ (B); _Bowie s.n._ (G); _Roxburgh s.n._ (G); _Lichtenstein 478_ (B); _Thom s.n._ (K); *_Lehmann s.n._ (S); _Drège 4892_ (S); _Sparrman s.n._ (S); _Thunberg s.n._ (S, UPS); _Pappe s.n._ (S, Z); Porterville, hills, _Schlechter 10742_ (B, BOL, G, K, MO, PRE, Z), _4882_ (B, BOL, SAM, WU, Z); Remhoogte, Ceres distr., _Marloth 10605_ (MO, PRE, STE); Olifants R. valley, _Penther 686_ (K), _Barker 5605_ (NBG); Riversdale distr., *_Muir 4883_ (K).

25. **Hesperantha cedarmontana** Goldbl., sp. nov. **Fig. 25.**

Plantae 120–450 mm altae, *cormo* ca. 12 mm in diametro, campanulato, tunicis imbricatis, *foliis* 3, inferioribus duobus basalibus, *spicis* (1–)3–8 floribus, *bracteis* (6–)10–14 mm longis, *floribus* hypocrateriformibus, albiscremeis, *tubo perianthii* 10–13 mm longo, staminibus inclusis, *tepalis* 10–12 mm longis, *filamentis* ca. 1 mm longis, *antheris* 5–6 mm longis, in tubo inclusis, apicibus vix emergentibus, ramis styli in tubo inclusis.

Type: S. Africa, Pakhuis Mts., near Leipoldt's grave, *Goldblatt 6403* (MO, holotype; K, NBG, PRE, isotypes).

Plants (120–)150–250(–450) mm high. *Corm* campanulate, symmetrical, flat based, ca. 12 mm in diameter at widest, tunics brown, imbricate, outer layers progressively smaller, margins notched below into segments, each with an irregularly fringed to serrate lower margin. *Cataphyll* solitary, membranous to brownish, and often broken. *Leaves* 3, usually less than half the length of the stem, lower 2 basal and often prostrate, margins sometimes thickened, apices often obtuse, upper leaf basal, or inserted above ground, and sheathing stem at base, or in lower half, and with short free apex. *Stem* erect, unbranched, bearing a short sheathing bract in upper half. *Spike* (1–)3–8-flowered, flexuose, lax; *bracts* (6–)10–14 mm long, herbaceous, margins hyaline and often red-flushed at apices, inner about as long as outer. *Flower* hypocrateriform, white-cream, flushed pinkish on reverse of outer tepals, opening towards evening and then richly carnation-scented; *perianth tube* 10–13 mm long, straight, exserted from bracts; *tepals* 10–12 mm long, outspread when fully open, ca. 4 mm wide, lanceolate-elliptic. *Filaments* less than 1 mm long, included in tube; *anthers* ca. 3,5 mm long, contiguous, apices just emerging from perianth tube. Ovary ca. 2 mm long, style very short, ca. 3 mm long, dividing in lower half of perianth tube, branches included in tube and reaching to middle only or to the apex and contiguous with the anthers. *Capsule* 10–15 mm long, ovoid-oblong, apex exserted from bracts. *Chromosome number* $2n = 26$ (*Goldblatt 5130, 6403.*)

Flowering time: September–late October, at higher altitudes; flowers opening 18h30–19h00, closing before daylight.

Distribution: Cedarberg and Cold Bokkeveld Mountains, in shallow, seasonally moist soils usually among rocks, middle to high altitudes, and on Zebrakop in the Piketberg. Fig. 25.

The corm and general habit of *Hesperantha cedarmontana* are very like *H. falcata*, and the two are easily confused unless the floral details are examined. *Hesperantha cedarmontana* has very short filaments, less than 1 mm long, inserted in the middle of the perianth tube, while only apices of the

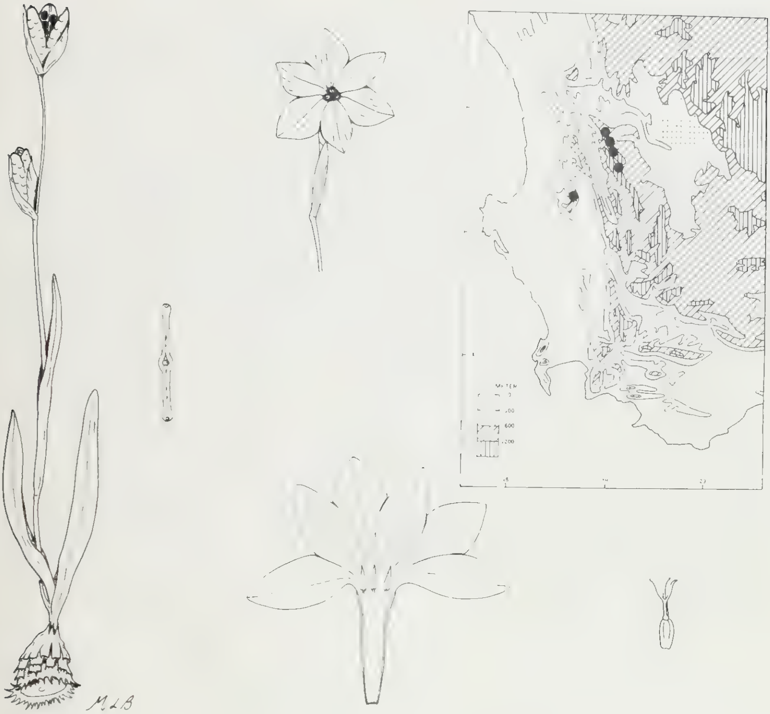


FIG. 25.
Morphology and distribution of *Hesperantha cedarmontana*. Habit and flower life-size; opened flower and gynoecium × 1,5; leaf section much enlarged (vouchers: fruiting material *Goldblatt 5130*, Middelberg, Cedarberg; flowering material *Esterhuysen 34596*, Piketberg).

comparatively short anthers emerge from the mouth of the tube. The style is also unusual in dividing in the lower half of the tube, with the branches reaching only to the middle or upper part of the tube and then in contact with the anthers. The partly included stamens and style are unique in section *Hesperantha*, where *H. cedarmontana* clearly belongs, but this combination of characters recurs in the related *H. saldanhae* (also section *Hesperantha*) which has unusually short but exserted filaments, only partly included style branches and in *H. elsiae* (section *Radiata*).

Hesperantha cedarmontana occurs along the Cedarberg mountain chain at mid- to upper elevations from Pakhuis Pass through the Cedarberg, to

Hex Berg in the Cold Bokkeveld in the south. An outlying population was discovered in 1980 by Elsie Esterhuysen on Zebrakop, *Esterhuysen 34596*, in the Piketberg Mountains. The species grows in damp, often shady places, frequently on the south side of rocks and boulders, or in crevices in cliffs.

SOUTH AFRICA, CAPE—3218 (Clanwilliam): Pakhuis Pass (-AA), *Esterhuysen 3192* (BOL), *Lewis 1863* (SAM), *Barker 4708* (NBG); Pakhuis Pass, 2500 feet, *Bond 603* (NBG); Near Leipoldt's Grave, Pakhuis Mts., *Goldblatt 6403* (K, MO, NBG, PRE); Zebrakop, Piketberg (-DB), *Esterhuysen 34596* (BOL, MO)
—3219 (Wuppertal): Welbedacht valley, Cedarberg, 5500 feet (-AC), *Barnes s.n.* (BOL *19472*); Middelberg, Cedarberg 4500 feet, *Kerfoot 5964* (NBG), *Goldblatt 5130* (MO); Welbedacht Kloof, *Stokoe s.n.* (SAM *55683*); Krakadouw Peak, damp ledge, *Esterhuysen 12089* (BOL); Hexberg, Cold Bokkeveld (-CA), *Goldblatt 7120* (MO).

26. **Hesperantha pauciflora** Lewis, Fl. Pl. Africa **18**: tab. 682. 1938. **Fig. 26.**

Tritonia pauciflora Baker, Handbk. Irid. 193. 1892, et Flora Cap. **6**: 124. 1896. Namaqualand, Mts. near Naries, 3 400 feet, *Bolus 6622* (BOL, lectotype here designated), hom. illeg. pro *T. pauciflora* (Baker) Klatt, Abh. nat. Ges. Halle **15**: 358. 1882. (syn. *Gladiolus floribundus* Jacq.).

Hesperantha burtonii L. Bol. ms., *L. Bolus s.n.* (BOL *21241*, K, PRE, SAM).

Hesperantha marlothii Schltr. ms., *Marloth 7643* (PRE), *7657* (B).

Plants (40–)100–180(–250) mm high. *Corm* ca. 10 mm in diameter at base, symmetric, campanulate, tunics imbricate, older layers accumulating above, black, woody, entire, basal margin usually bearing radiating spiny projections. *Cataphyll* apparently lacking. *Leaves* 3–5, basal, half to two-thirds the height of whole plant, ensiform-oblong, obtuse-subacute (3–)5–6 mm wide, margin hyaline, occasionally slightly raised, uppermost leaf largest, conspicuously sheathing lower two-thirds of stem, and monofacial towards apex only. *Stem* erect, single, or 1–2-branched from near base. *Spike* flexuose, (1–)2–4-flowered; *bracts* membranous, pale green to transparent, often red-flushed and dry at apices, 9–14 mm long; inner narrower, about as long. *Flower* hypocrateriform, pink to reddish-purple, darker on reverse of outer tepals (when dry, inner tepals fade more rapidly and seem pale); *perianth tube* 6–11 mm long, cylindrical; *tepals* unequal, spreading, outer larger, 18–23(26) mm long, narrowly elliptic, 7–9 mm at widest. *Filaments* 2,5–7 mm long; *anthers* 5,5–9 mm, usually longer than filaments, occasionally as long. Ovary 2,5–4 mm, style branches 9–15 mm long. *Capsule* ovoid, 5–10 mm long. *Chromosome number* $2n = 26$ (*Goldblatt s.n.*—no voucher, Welkom, Kamiesberg; *Goldblatt 231*).

Flowering time: late August–September (early October at high altitudes).

Distribution: local in Namaqualand, especially in the Kamiesberg, and on the Nieuwoudtville escarpment; mainly in seasonally waterlogged sandy soils. Fig. 26.

Hesperantha pauciflora is an attractive, large red-purple to pink-flowered species of sandy to light clay soils in Namaqualand and the Nieuwoudtville escarpment. It is most common in fairly shallow, waterlogged sand, close to the edge of the Nieuwoudtville escarpment amongst Restionaceae and other fynbos species. It grows in similar wet sandy conditions in the Kamiesberg, and elsewhere in Namaqualand, but also occurs on heavier clay soil around Nieuwoudtville, on the edge of the Karoo in much drier conditions and in a renosterbos plant community. Plants vary considerably in size, depending on seasonal rainfall and soil depth, and in especially shallow or stony soils plants may be only 40–50 mm tall, while nearby, in deeper soil, individuals may reach 250 mm. The daily timing of flowering is fairly precise: flowers open at about midday, earlier in hot weather and later in cold conditions; and close between 16h00 and 16h30. *Hesperantha pauciflora* is sympatric with *H. marlothii*, an evening-blooming species, along the Nieuwoudtville escarpment, while further east around the town of Nieuwoudtville, it is sympatric with *H. cucullata, H. radiata* and *H. bachmannii*, all evening-blooming, and the blue-flowered form of *H. pilosa*, the flowers of which open at daybreak and close at about midday. Locally, *H. vaginata* can occur alongside *H. pauciflora*, but *H. vaginata* prefers deeper, richer clay soils and is not truly sympatric. This concentration of species of *Hesperantha* essentially in the same community, and with overlapping flowering times, is remarkable. No interspecific hybrids have been recorded between any of the species and it can be assumed that differences in daily flowering time, or different flower shapes or scents discourage pollinators from straying from single species.

Hesperantha pauciflora appears to be related to the *H. falcata* complex, and is in fact very similar to this species. The corms are typical of section *Hesperantha*, being campanulate in shape with a flat side, and basal margins sometimes bearing short thick spines. It is closely allied to the Kamiesberg endemic, *H. latifolia*, and the two almost certainly share a common ancestor. *Hesperantha latifolia* is the more specialised, having a long perianth tube, and a short, sometimes entirely subterranean stem. This species grows in shallow seasonal pools or thin layers of waterlogged sand in granite outcrops, while *H. pauciflora* always grows in deeper and better drained soils.

When first described, the species was assigned to *Tritonia* as *T. pauciflora* (Baker, 1892), and it is an illegitimate homonyn for *T. pauciflora* (Baker)

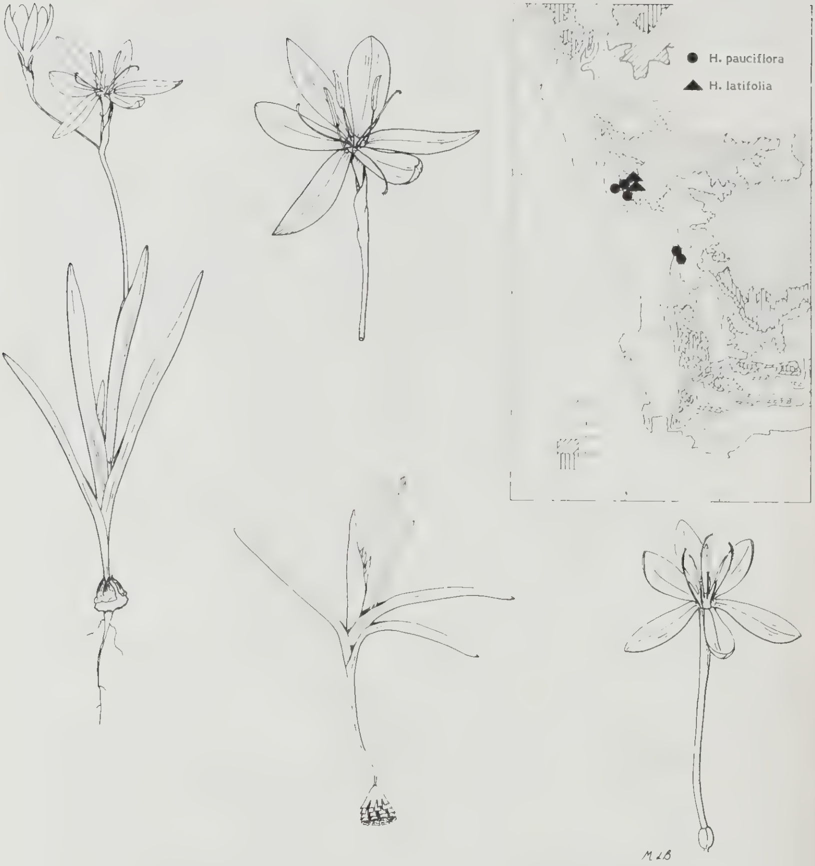


FIG. 26.
Morphology and distribution of *Hesperantha pauciflora* (above) and *H. latifolia* (below). Habits × 0,5; flowers life-size (vouchers: *H. pauciflora Goldblatt 3953*, Nieuwoudtville; *H. latifolia Goldblatt 5760*, Kamiesberg).

Klatt. This latter species is a synonym of *Gladiolus floribundus* Jacq. (Lewis *et al*., 1972). *Hesperantha pauciflora* is thus treated as a new name dating from 1938 when Lewis assigned it to this genus.

SOUTH AFRICA, CAPE—2917 (Springbok): 5,3 km south of Kosies house on Kosies Rabas road (-BA), *van Berkel 398* (MO).
—3017 (Hondeklipbaai): Grootvlei (-BB), *Lewis 4336* (SAM), *Lewis 5219* (NBG),

Barker 3736 (NBG), *8406* (NBG), *Acocks 19465* (K, NBG, PRE); Grootvlei valley, *Compton 6610* (NBG).

—3018 (Kamiesberg): Near Naries, Kamiesberg (-AC), *H. Bolus 6222* (BOL); Bailey's vlakte, wet ground, *Pearson 6611* (BOL, SAM); Top of Studers Pass, Kamiesberg, *Goldblatt 4046* (MO); Leliefontein, *Rodin 1454* (BOL, K, UC), *Goldblatt 5766* (B, MO, PRE, S, US, WAG); Welkom, sandy flats, *Oliver 3530* (K, MO, PRE); Garies–Bitterfontein (-C), *Leipoldt 3871* (BOL).

—3119 (Calvinia): Nieuwoudtville (-AC), *Watermeyer s.n.* sub *Marloth 5567* (PRE), *Buhr s.n.* (BOL, STE *25428*), *Loubser 941* (NBG), *Compton 20886* (NBG), *L. Bolus s.n.* (BOL *21241*, K, PRE, SAM), *Goldblatt 231* (BOL); 5 miles E of Nieuwoudtville, *Lewis 2286* (SAM, PRE), *Barker 6535* (NBG); Near Grasberg, NW of Nieuwoudtville, *Lewis 5830* (NBG), *5848* (NBG, STE), *Goldblatt 274* (BOL); Glenlyon farm, *Goldblatt 3953* (MO, PRE, US, WAG); Willemsrivier, Nieuwoudtville, *Leipoldt 814* (SAM); Uitkomst, SW of Nieuwoudtville, *Barker 6535* (NBG), *10741* (NBG); Oorlogskloof, sand near river, *Leipoldt 798* (SAM); Papelfontein hills, *Schlechter 10904* (B, BOL, G, GRA, K, L, MO, PH, PRE, US, Z); Van Rhyns Pass, flats, *Diels 606* (B); W of Nieuwoudtville, *Marloth 7657* (B, PRE); Top of Van Rhyns Pass, *Oliver 3848* (K, MO, PRE, S, STE), *Goldblatt 3073* (MO, S); Cloudskraal road, Nieuwoudtville plateau, *Goldblatt 6220* (MO).

Without precise locality: Namaqualand Minor, *Scully 88* (BOL, Z).

27. **Hesperantha latifolia** (Klatt) De Vos, Jl S. Afr. Bot. **40**: 252. 1974. **Fig. 26.**

Syringodea latifolia Klatt, Abh. nat. Ges. Halle **15**: 403 (Ergänz. 69). 1882; Baker, Flora Cap. **6**: 36. 1896. Type: S. Africa, Cape, am Ellenboogsfonteinberg, *Drège 2633* (B, lectotype; P, S, isolectotypes).

Hesperantha pearsonii Foster, Contr. Gray Herb. **166**: 21. 1948. Type: S. Africa, Cape, Namaqualand, Khamsoap Ravine, *Pearson 6539* (B, holotype; MO, isotype).

Plants (40–)60–100(–180) mm high. *Corm* ca. 10 mm in diameter at base, symmetric, campanulate with a flat base, tunics black, woody, entire, basal margin usually with radiating spiny projections. *Cataphyll* evidently lacking. *Leaves* 3–5, basal, falcate or erect and then reaching to top of spike, ensiform-oblong, obtuse to acute (1–3–)4–7 mm wide, margin hyaline, uppermost leaf often largest, sheathing stem entirely or in lower part. *Stem* underground or more often short and aerial, erect, single or 2–3-branched from near base. *Spike* straight, 1–3-flowered; *bracts* membranous, pale green to transparent, often red-flushed and dry at apices, (6–)10–15(–20) mm long, inner narrower, slightly shorter. *Flower* hypocrateriform, deep pink to purple, darker on reverse of outer tepals; *perianth tube* 15–25 mm long, cylindric, slightly wider near apex; *tepals* unequal, outer somewhat larger, spreading, 15–23 mm long, narrowly elliptic, 4–9 mm at widest. *Filaments* (4–)7–10 mm long; *anthers* (4–)5,5–7 mm, equal to or shorter than the filaments. Ovary ca. 4 mm, style branches longer than the anthers. *Capsule* ovoid, 6–10 mm long. *Chromosome number* $2n = 26$ (*Goldblatt 5760*).

Flowering time: August–September.

Distribution: restricted to the Kamiesberg, in Namaqualand, in shallow pools and thin damp sand overlying rock. Fig. 26.

Hesperantha latifolia is an endemic of the Kamiesberg massif in central Namaqualand, where it occurs above 1 000 metres. It grows in a very distinctive habitat, shallow seasonal pools, or in damp sand or moss overlying flat or concave rock shelves. Plants growing in favoured situations are tall, with produced aerial stems and have up to three flowers, while those in more extreme sites, or in dry seasons, are dwarfed, with narrow leaves, no produced stem, and one or two flowers.

The dwarfed plants match exactly the type collection made by Drège in the 1820's. Similar gatherings of entirely dwarfed individuals are few (e.g. *Stokoe s.n.* in SAM). More often collections consist of plants ranging in size (*Hutchinson 878, Schlechter 11221, Goldblatt 5769*) or entirely of quite large specimens as in the type gathering of *Hesperantha pearsonii* (*Pearson 6539*). *Hesperantha latifolia* was first described as a species of *Syringodea,* owing to its long, slender perianth tube and lack of an aerial stem. When the type, *Drège 2633* in the Paris Herbarium, was examined by Dr. M. P. de Vos, during her study of *Syringodea*, she found the style and style branches typical of *Hesperantha* (De Vos, 1974). In the latter genus the broad, equitant leaves are of course quite typical, and in fact the leaves of the type form of *H. latifolia* are not unusual for the genus.

Hesperantha latifolia, particularly larger individuals, closely resembles the more widespread *H. pauciflora,* and the two species are certainly closely allied. Both species occur in the Kamiesberg, often in close proximity. *H. pauciflora* however, generally grows in deep sandy soil, often seasonally waterlogged, while *H. latifolia* is restricted to rocky sites with shallow wet soil, or rock pools. *H. latifolia* is readily recognised by its deep pink colour and long perianth tube, well exserted from the floral bracts. It differs in the latter character from *H. pauciflora* which has a short tube, usually shorter than the bracts, as well as in several minor technical characters. These include leaves as long as the spikes, anthers usually rather shorter than in *H. pauciflora,* and equal to or shorter than the filaments.

SOUTH AFRICA, CAPE—3017 (Hondeklipbaai): "am Ellenboogsfonteinberg" (now Boesmanskop) (-BB), *Drège 2633* (B, P).
—3018 (Kamiesberg): Near Kamieskroon (I'Aus) (-AC), *Schlechter 11221* (B, PRE); Khamsoap ravine, *Pearson 6539* (B, MO); Naras ravine, wet sand, *Pearson 6533* (BOL, SAM); Below top of Studers Pass, mossy damp rocks, *Thompson 216* (STE); E slopes of Rooiberg near Welkom, *Goldblatt 4058* (MO), *Goldblatt 5760* (B, K, MO, NBG, PRE, S, US, WAG); am Modderfonteinsberg, *Drège 8488* (G, P, S); Sneeukop, Kamiesberg, *Hutchinson 878* (BOL, K).

Without precise locality: Namaqualand, 1929, *Stokoe 6162* (BOL, SAM).

28. **Hesperantha luticola** Goldbl., sp. nov. **Fig. 27.**

Plantae 50–100 mm altae, *cormo* campanulato, spinoso, *foliis* 4–5, basalibus, 50–100 mm longis, *spicis* reductis, 1–2 floribus, *bracteis* 17–20 mm longis, membranaceis, *floribus* hypocrateriformibus, albis purpureis maculatis ad basem tepalorum, *tubo perianthii* (15–)30–45 mm longo, *tepalis* 10–15 mm longis, *filamentis* 3 mm longis, *antheris* 3–5 mm longis.

Type: S. Africa, Cape, farm Knecht's Bank, E of Swartberg, between Middelpos and Calvinia, *Thompson 2529* (STE, holotype; PRE, isotype).

Plants small, 50–100 mm high, including leaves. *Corm* more or less campanulate, symmetric, with a flat base, tunics black, V-notched on basal margin of outer layers, basal margins with projecting teeth. *Cataphyll* solitary membranous. *Leaves* 4–5, basal, equitant, straight to slightly falcate, 50–100 mm long. *Stem* entirely underground, and concealed by leaf bases. *Spike* reduced, 1–2-flowered; *bracts* membranous, pale, 17–20 mm long, concealed by leaf bases, inner smaller than outer. *Flower* hypocrateriform, white, with purple blotches at base of inner tepals, outer tepals lilac on reverse; *perianth tube* (15–)30–45 mm long, cylindric; *tepals* spreading, outer 10–15 mm long, lanceolate, 4–6 mm wide, obovate, inner 10–13 mm. *Filaments* 3 mm long; *anthers* 3–5 mm, erect. Ovary ca. 4 mm long, style branches ca. 12 mm, spreading horizontally. *Capsule* oblong, (10–)15–25 mm long. *Chromosome number* $2n = 26 + 2B$ (*Goldblatt 5814*).

Flowering time: July-August.

Distribution: seasonal wet depressions and pools on the Roggeveld escarpment and on the Hantamsberg above Calvinia. Fig. 27.

This distinctive, long-tubed species was barely known until the last decade when collections were made by W. F. Barker and M. Thompson independently and then subsequently by myself. Despite the few collections over a distance extending some 120 km from the Hantamsberg at Calvinia to near Sutherland, *Hesperantha luticola* is fairly common and can be found frequently in suitably moist habitats such as seasonal pools and seeps, wet in the winter and spring. It flowers unusually early in this area of cold winters, usually in July, when much of the other vegetation is still in the early stages of growth and it is usually overlooked in fruit, two months later, when most collecting is done in the western Karoo. The reduced acaulescent growth form of *Hesperantha luticola* is paralleled in several other western Karoo species, notably *H. humilis* and *H. hantamensis*, but it is apparently unrelated to these species which have globose, asymmetric corms with imbricate tunics, and clearly belong in section *Imbricata*. *Hesperantha luticola* has campanulate corms with a large, often oblique flat side, from the margins of

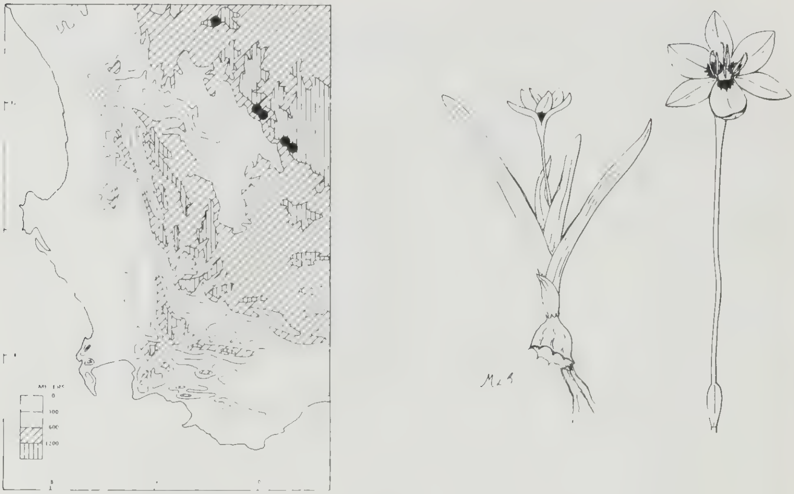


FIG. 27.
Morphology and distribution of *Hesperantha luticola*. Habit × 0,5; flower life-size (voucher *Goldblatt 6067*, west of Middelpos).

which short spikes project. The corm is most like that found in section *Hesperantha*, especially *H. pauciflora* and *H. latifolia*, both Namaqualand species, and it is to these that it is most probably related.

SOUTH AFRICA, CAPE—3119 (Calvinia): Hantamsberg, Calvinia, summit plateau (-BD), damp hollow, *Thompson 2344* (PRE, STE).
—3120 (Williston): Blomfontein farm, W of Middelpos (-CC), *Barker 10772* (NBG), *Goldblatt 5814* (K, MO); 60 km SE of Calvinia, on road to Middelpos via Blomfontein, *Goldblatt 6067* (K, MO, NBG, S, US); E of Swartberg, farm Knegts Bank, temporary pool, *Thompson 2529* (PRE, STE).
—3220 (Sutherland): Roggeveld, Quaggasfontein road, beyond Agterplaas, near Uitkyk, 4700 ft (-AB), *Goldblatt 6350* (MO); Sneeukrans Mt., 4500 ft, S of Voëlfontein farmstead (-AD), *Goldblatt 6340* (MO, NBG).

29. **Hesperantha spicata** (Burm.f.) N.E. Br., Kew Bull. **1929**: 136; Foster, Contr. Gray Herb. **166**: 25. 1941. **Fig. 28.**

Ixia spicata Burm.f., Prod. Fl. Cap. **1**. 1768. Type: S. Africa, Cape, probably cultivated in Holland, *Burman s.n.* (Herb. Burman, G, holotype).

Plants 120–300(–500) mm high, slender. *Corm* more or less campanulate to conic, flat based, 10–15 mm in diameter at base, tunics of entire, brittle, subwoody layers, outer layers sometimes irregularly broken, lower margin of each layer often somewhat fringed, or irregularly split. *Cataphyll* usually solitary or apparently lacking. *Leaves* usually three, lower two erect and linear or fistulose, or falcate and often crisped, upper sheathing for most of its length. *Stem* erect, always simple, with one or sometimes two short, sheathing bract leaves. *Spike* erect, remote from leaves, 4–20-flowered; *bracts* 5–7(–9) mm long, outer green, often red-tipped, inner more or less equal, sometimes slightly longer, membranous with two green veins, apically bifurcate. *Flower* stellate, white, secund, reverse of outer tepals brownish-purple; *perianth tube* cylindrical, ca. 4 mm long in newly opened flowers, sometimes reaching 6 mm later; *tepals* subequal, narrowly ovate, 4–7(–9) mm long. *Filaments* ca. 2 mm long; *anthers* articulated, 3,5–4,5 mm long. Ovary ca. 2 mm long, style branches ca. 3 mm. *Capsule* 7–9 mm long, obovoid, longer than bracts. *Chromosome number* $2n = 26$ (subsp. *graminifolia* only, *Goldblatt 416, 5263*).

Flowering time: August–September(–October).

Distribution: western Cape, from the Peninsula north to the Piketberg and Porterville Mountains, and east to French Hoek and Wolseley. Fig. 28.

Hesperantha spicata is a distinctive, small-flowered species typically with long secund spikes of up to 20 flowers, and flat-sided, campanulate corms. It is restricted in range to hills and flats of the western Cape coastal belt, with limited extensions into the valleys interior to the mountain ranges that run parallel to the west coast from Gordons Bay north to Porterville. The vegetative morphology is unusually variable, leaves ranging in form from linear to falcate to terete and fistulose, and with margins plane to undulate or crisped. Plants with different leaf types have been described as distinct species. These differences in leaf morphology are accompanied by little or no floral variation and the extremes are linked by intermediates so that recognition based solely on leaf morphology seems unnecessary, and the three species and one variety recognised by Foster (1948) are reduced here to three subspecies. Details of differences between the subspecies are discussed following their descriptions.

KEY TO THE SUBSPECIES

1. Basal leaves *Juncus*-like, terete and hollow, no mid-vein evident .... 3. subsp. **fistulosa**

1′. Basal leaves flat, monofacial, with mid-vein well developed.
   2. Non-sheathing basal leaves firm-textured, erect or falcate, margins crisped (less often plane) .... 1. subsp. **spicata**
   2. Non-sheathing basal leaves soft-textured, erect, narrow, margins plane .... 2. subsp. **graminifolia**

1. subspecies **spicata. Fig. 28B and C.**

Hesperantha cinnamomea (L.f.) Ker, Konig & Sims, Ann. Bot. **1**: 225. 180.

Ixia cinnamomea L.f. Suppl. Pl. 92. 1782. Type: S. Africa, Cape, "in collibus Leuwestaart", *Thunberg s.n.* (Herb. Thunb. *937* UPS, lectotype; S, isotype).

Hesperantha spicata var. *cinnamomea* (L.f.) Foster, Contr. Gray. Herb. **166**: 25. 1948.

Plants 120–300 mm high. *Leaves* erect to falcate, often with distinct hyaline marginal ridge, margins plane, or more often crisped, 50–150 mm long, 50–80 mm at widest. *Spike* with 5–12(–17) flowers, *bracts* 5–7 mm long. *Tepals* 4–7 mm long. *Chromosome number* unknown.

Distribution: stony and clayey soils, from the Piketberg Mountains in the north, to drier parts of the Cape Peninsula, and inland near Wolseley. Fig. 28.

The type specimen of *Hesperantha spicata* is a robust plant with broad, erect, straight-margined leaves of firm texture and is very different from the type of *H. cinnamomea* which has crisped, short falcate leaves. The two represent the extremes of the range of form found in subspecies *spicata* and they are linked by a large number of intermediate forms. Occasionally almost the whole range of leaf types can be found in a single collection, e.g. *Goldblatt 5774* from Piketberg. There seems little reason to give taxonomic recognition to the form typified by *H. cinnamomea*, although Foster (1948) acknowledged it as a variety of *H. spicata*.

SOUTH AFRICA, CAPE—3218 (Clanwilliam): Flats N of Piketberg, at foot of Zebra Kop (-DB), *Goldblatt 6130* (MO); Witte Water, 10 miles W of Piketberg (-DC), *Lewis 2004* (SAM); Near Berg R. bridge, *L. Bolus & Lewis s.n.* (BOL); Near top of Versveld Pass, Piketberg, *Goldblatt 5774* (K, MO, NBG, PRE, S).
—3318 (Cape Town): Klipberg, Darling (-AD), *Bachmann 1176* (B); Darling, *Bachmann 285* (B); Malmesburg–Hopefield (-A-B), *Salter s.n.* (BOL *31529*); Near Moorreesburg, shale hills (-BA), *Acocks 24397* (PRE); Signal Hill, slopes (-CD), *Penfold s.n.* (SAM *52896*); Above Tamboers Kloof, *Michell s.n.* (NBG); Kloof, Lion's Head, *Diels 68* (B); Slopes of Lion's Head, *Drège s.n.* (SAM), *Lewis 1084* (SAM); Above Sea Point, *Guthrie s.n.* (BOL *16644*); Lion's Back, *Wolley Dod 584* (BOL, K); Löwenrücken, *Ecklon s.n.* (K, S); Leeuwestaart, *Pappe s.n.* (1835) (S); Rosebank, Cape Town, *H. Bolus s.n.* (BOL *3768*, GRA, K); Wellington (-DB), *Loubser 932* (NBG); Farm Paarl Diamant, Paarl distr., *Acocks 24415* (K, PRE); Langverwacht, above Kuils River (-DC), *Oliver 4326* (K, MO, PRE, S, STE).
—3319 (Worcester): Piketberg Road (Gouda) (-AC), *Schlechter 10711* (B), *4852* (B, G, GRA, K, WU, Z); Botha's Halt, *Gillett 253* (STE).
—6418 (Simonstown): Hottentots Holland (-BB), *Drège s.n.* (SAM).

Without precise locality: Cape of Good Hope, *Bergius 466* (B); *Siebold 575* (B); *Link 1199* (B); *Verreaux 1831* (G); *Roxburgh s.n.* (G); *Thunberg s.n.* (S, UPS).

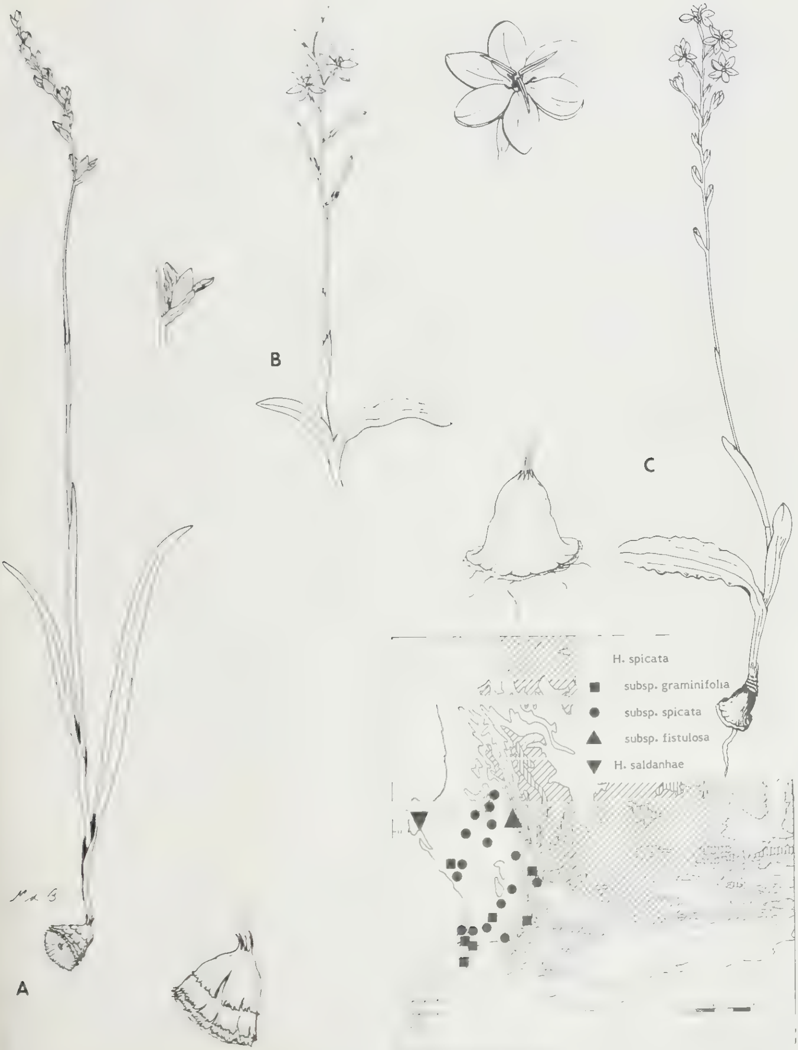


FIG. 28.
Morphology of *Hesperantha spicata* and distribution of *H. spicata* and *H. saldanhae*. A: *H. spicata* subsp. *graminifolia*; B and C: *H. spicata* subsp. *spicata*. Habits × 0,5; fruit and corms life-size; flower × 2 (vouchers A: *Goldblatt 5023*, Cape Point; B: *Goldblatt 6130*, foot of Zebrakop; C: *Goldblatt 5774*, Piketberg).

2. subspecies **graminifolia** (Sweet) Goldbl., comb. nov. et stat. nov. **Fig. 22A.**

Hesperantha graminifolia Sweet Hort. Suburb. Lond. 9. 1818 & Hort. Brit. ed. 2., 503. 1830; Baker, Flora Cap. **6**: 59. 1896; Foster Contr. Gray Herb. **166**: 14. 1948. Type: illustration of *H. pilosa* var. β, Bot. Mag. tab. 1254. 1810 (lectotype).

Plants (150–)200–500 mm high. *Leaves* three, occasionally two, 70–150 mm long, comparatively soft in texture, straight, rarely slightly falcate, linear-lanceolate, 2–5(–8) mm wide, margins plane, lower two basal, upper basal or inserted shortly above ground and sheathing, with a short free apex. *Spike* (4–)9–20-flowered; *bracts* 5–8 mm long. *Tepals* 5–8(–9) mm long. *Chromosome number* $2n = 26$ (*Goldblatt 5263, 416* as *H. spicata*).

Flowering time: (August–)mid September–October.

Distribution: mainly on sandy soils, common on the Cape Peninsula but extending north to Darling and east to the French Hoek Mountains. Fig. 28.

Subspecies *graminifolia* shares with the typical subspecies all features except for its characteristically narrow, soft-textured, erect leaves with plane margins. Some populations are intermediate in leaf character between subsp. *graminifolia* and subsp. *spicata*. *Salter s.n.* (BOL *31529*, Hopefield–Malmesbury) has the narrow erect leaves of subsp. *graminifolia*, but slight crisping of the margins; *Tyson 1540* from Kluitjieskraal near Wolseley (Ceres Road) consists of plants some of which have short, falcate leaves and others with longer, erect leaves; and a collection from Versveld Pass, Piketberg (*Goldblatt 5774*) of mainly short, crisped leafed plants contains several individuals with longer leaves with plane margins. Naming such collections to subspecies becomes arbitrary. This subspecies is most common on the Cape Peninsula where it occurs on sandy soils. It flowers profusely after summer fires and seldom at other times.

SOUTH AFRICA, CAPE—3318 (Cape Town): Versfeld Nature Reserve, Darling (-AC), *Goldblatt 461* (BOL); Darling Flora Reserve (-AD), *Barker 8650* (NBG), *Lewis 5072* (NBG); Burnt slopes above Window Gorge, Table Mt. (-CD), *Esterhuysen 11229* (BOL); Burnt slopes, Nursery Gorge, Kirstenbosch, *Esterhuysen 11715* (BOL, K); Cecilia, 1000 ft., *Barker 4285* (NBG); Kenilworth Race Course, *Lewis 58* (SAM), *Barker 4800* (NBG); Kenilworth, *H. Bolus s.n.* (BOL *7246*, K), (BOL *8026*), (BOL *3768* in PRE); Wynberg, *Zeyher 429* (SAM), *Schlechter 1564* (B, GRA, Z); Camps Bay, *Zeyher 141* (PRE, SAM), *Cassidy 39* (NBG); Foot of Table Mt., near town, *MacOwan 2386* (K, S, SAM, WU); Lion Rump, *Thode 7774* (STE); Hercules Pillar (-DD), *Compton 13687* (NBG).
—3319 (Worcester): Ceres Road (Wolseley), sandy sites (-AC), *Tyson 2958* (SAM); Kluitjies Kraal, S of Wolseley, *Tyson 1540* (B, G, K, SAM, Z); Sandy flats, Romans River Nature Reserve, *Goldblatt 6289* (MO); French Hoek Pass, 1500 ft (-CC), *Barker 5337* (NBG).

—3418 (Simonstown): Mountains around Simonstown (-AB), *H. Bolus s.n.* (BOL *4690*, K); Kalk Bay Mt., *Barker 4227* (NBG); Near Paulsberg, Cape Peninsula (-AD), *Lewis 1596* (SAM); W slopes of Klaasjagersberg, opposite Cape Point Reserve, *Goldblatt 5263* (K, MO, NBG, PRE, S, WAG); Stony N facing slope between Fish Hoek and Sun Valley, *Goldblatt 5920* (MO).

3. subspecies **fistulosa** (Baker) Goldbl., comb. nov. et stat. nov.

Hesperantha fistulosa Baker, Bull. Herb. Boiss. sér 2, **4**: 1004. 1904; Foster, Contr. Gray Herb. **166**: 11–12. 1948. Type: S. Africa, Cape, near Porterville, *Schlechter 4885* [G, lectotype designated by Foster (1948: 12), B, BOL, G, GRA, K, SAM, WU, Z, isolectotypes].

Plants 150–200 mm high. *Leaves* 40–80 mm long, fistulose, terete when live, ca. 2 mm in diameter, and evidently without a central vein. *Spike* with 4–9 flowers; *bracts* 5–6 mm long. *Tepals* (4–)5–6 mm long. *Chromosome number* unknown.

Distribution: local in the Porterville district. Fig. 22.

Subspecies *fistulosa* is readily recognised by its slender, fistulose leaves, but in all other characters it is virtually identical to the other subspecies of *H. spicata*. Its flowers and bracts are generally rather small but fit well within the range of the species. It is restricted to the Porterville area, growing where I have seen it, on damp clay soil.

SOUTH AFRICA, CAPE—3318 (Cape Town): Near Porterville (-BB), *Schlechter 4885* (B, BOL, G, GRA, K, SAM, WU, Z), *10731* (B, BOL, GRA), *2567* (PRE); Porterville, *Schlechter 2567* (PRE); Porterville–Twenty Four Rivers, *Goldblatt 3921* (K, MO, NBG).

30. **Hesperantha saldanhae** Goldbl., sp. nov.

Plantae 150–250 mm altae, *cormo* 10–12 mm in diametro, campanulato, tunicis imbricatis, *foliis* 3, basalibus vel superiore supra terram inserto, 5–6 mm latis, *spicis* 5–8 floribus, *bracteis* 7–10 mm longis, acutis, *floribus* ?hypocrateriformibus, albis, *tubo perianthii* ca. 9 mm longo, *tepalis* 9–10 mm longis, *filamentis* brevibus, 1 mm longis, *antheris* 2–3 mm longis, ramis styli 4 mm longis, in tubo divisis et apicibus vix emergentibus.

Type: S. Africa, Cape, granite rocks at Vredenburg, *Lewis 5977* (NBG, holotype).

Plants 150–250 mm high. *Corm* campanulate, symmetrical, 10–12 mm at widest point, base flat, tunics brown, woody, entire, or outer layers fragmented irregularly at places, basal margins irregularly fringed. *Cataphyll* solitary, membranous. *Leaves* 3, lower 2 or all 3 basal, lower two about one-third the length of the stem, ensiform, one partly sheathing the stem, 5–6 mm wide, third leaf sheathing lower half of stem with short free apex. *Stem* erect, simple, bearing a short and entirely sheathing bract in upper half. *Spike* straight, secund, 5–8-flowered; *bracts* 7–10 mm long, herbaceous, inner narrower, but often slightly longer than outer. *Flower* evidently white, facing laterally, ?hypocrateriform; *perianth tube* ca. 9 mm long initially, later reaching 12 mm and becoming well exserted from bracts and twice as long; *tepals* 9–10 mm long, ?outspread, narrowly ovoid, 4–5 mm wide. *Filaments* 1 mm long; *anthers* 2–3 mm long. Ovary 2–3 mm long; style dividing in the tube, branches 4 mm long, apices just emerging to reach base of anthers. *Capsule* unknown. *Chromosome number* unknown.

Flowering time: August.

Distribution: known only from the Saldanha Bay area near Vredenburg, among granite rocks. Fig. 28.

This species resembles closely *Hesperantha spicata* especially subspecies *graminifolia*, to which it was referred, as *H. graminifolia*, by G. J. Lewis who made the only known collection. The resemblance is striking and the species have the same general appearance, corm, and secund inflorescence with small flowers. A careful examination of the flowers, however, reveals rather sharp differences. The perianth tube is unusually long for *H. spicata*, about twice the length usual for that species while the anthers are very short, ca. 2–3 mm long, and almost sessile, on filaments about 1 mm long. In addition, the style divides well inside the perianth tube, and the branches just emerge from the mouth of the tube, reaching the base of the anthers. These differences are well beyond the range of variation found in *H. spicata*, with its comparatively short tube, long anthers and well exserted style branches, and compel the recognition of *H. saldanhae* as a distinct species, closely allied to *H. spicata*.

SOUTH AFRICA, CAPE—3217 (Vredenburg): Among granite rocks, Vredenburg (-DD), *Lewis 5977* (NBG).

Section RADIATA

4. Section **Radiata** Goldbl., Ann. Missouri Bot. Gard. **69**: 377. 1982.

Corm either ± asymmetric with one side flattened below or symmetric and campanulate in outline, tunics imbricate, outer covering inner only above, unbroken, or notched regularly below into sections, these sometimes ± ciliate-edged, occasionally lower margins of layers serrate to spiny. Outer bract margins usually united below around the axis, sometimes for over half their length. *Flower* ± actinomorphic, but usually with curved perianth tube (straight in *H. juncifolia* and barely curved in *H. brevifolia*) and pendulous, unilateral anthers, white-cream, or pale to deep pink, tube well exserted from bracts in some species.

Distribution: widespread in southern Africa: Namaqualand to Malawi.

Species: ca. 8, 5 in the winter rainfall area.

Type species: *H. radiata* (Jacq.) Ker

Section *Radiata* comprises a close-knit group of seven to nine species centred around the *H. radiata–H. tysonii* complex. This complex extends from Namaqualand through the south western Cape and Karoo into eastern southern Africa as far as Swaziland. Corm tunics vary to an unusual extent even within *H. radiata* sensu stricto, but the characteristic bracts usually with united margins, flowers with curved perianth tubes, and several, small leaves unite the section. There are several local endemics in the south western Cape including the terete-leafed *H. juncifolia* from limestone areas of the Bredasdorp coast; the deep pink-flowered *H. elsiae* from the Cedarberg, which has included stamens and style branches; and the very large-flowered *H. muirii* from the Riversdale district. *Hesperantha marlothii*, centred in the Roggeveld, has flat-sided corms with spiny margins and it, as well as the south western Cape *H. brevifolia*, have bracts in which the margins are barely fused. Section *Radiata* extends into Botswana, Zimbabwe and Malawi where the long-tubed *H. longicollis* and dwarf *H. ballii* occur.

31. **Hesperantha brevifolia** Goldbl., sp. nov. **Fig. 29.**

Plantae (100–)150–400 mm altae, *cormo* ad 5 mm in diametro, conico, tunicis imbricatis, *foliis* 3–5, inferioribus 1–3 basalibus, 2–3 mm latis, brevibus, *spicis* 2–5 floribus, *bracteis* 10–14 mm longis, percostatis, *floribus* ± secundis, albis, rubris dorso tepalis exterioribus, *tubo perianthii* 6–8 mm longo, propre apicem curvato, *tepalis* 8–13 mm longis, *filamentis* brevibus, 3–5 mm longis, *antheris* 5–6 mm longis, dependentibus.

Type: S. Africa, Cape, Zebrakop, Piketberg Mts., S slopes at 4000–4500 ft, *Esterhuysen 35320* (MO, holotype; B, BOL, BR, C, E, K, M, MO, NBG, P, PRE, S, US, WAG, isotypes).

Plants medium in size, (100–)150–400 mm high. *Corm* small, conic with an oblique flat base, to 5 mm at widest diameter, tunics imbricate, outer layers dark, accumulating above, innermost layer pale with conspicuous longitudinal ridges, lower margins flared outwards and minutely frayed. *Cata-*

phyll solitary, membranous, pale. *Leaves* 3–5, lower 1–3 basal, upper cauline, and partly sheathing, short, laminas 20–30 mm long, (1,5–)2–3 mm wide. *Stem* erect, with a leafy sheathing bract in upper half. *Spike* 2–5-flowered; *bracts* green, conspicuously veined, 10–14 mm long, amplexicaul, inner about as long as outer. *Flower* white, sometimes (sunnier sites) with red flush on reverse of outer tepals, secund, with upper tepals tilted upwards, lower downwards; *perianth tube* 6–8 mm long, about as long as bracts or slightly longer, curved at apex only; *tepals* subequal, reflexed, 8–13 mm long, to 4 mm wide, obovate, upper held erect, lower flexed downwards. *Filaments* 3–5 mm long; *anthers* hanging downwards, 5–6 mm long.

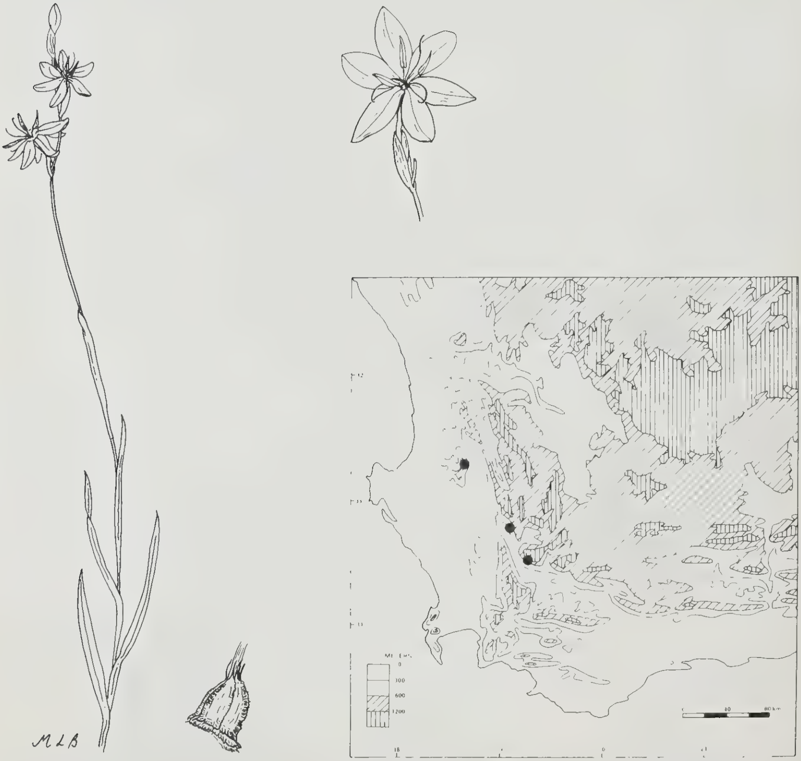


FIG. 29.
Morphology and distribution of *Hesperantha brevifolia.* Habit × 0,5; corm and flower life-size (voucher *Esterhuysen 35320*, Zebrakop, Piketberg).

Ovary ca. 3 mm long, style branches 40–50 mm long. Capsule 6–8 mm long, narrowly ovoid. *Chromosome number* $2n = 26$ (*Esterhuysen 35320*).

Flowering time: late October–late December.

Distribution: scattered in mountains of the western Cape, recorded only from the Piketberg Mountains, near Bains Kloof, Steendal near Tulbagh and above Wabooms River in the Hex River Mountains, in shallow soil, blooming profusely after fires. Fig. 29.

Hesperantha brevifolia is closely related to the widespread *H. radiata* and can easily be mistaken for this common species. Important differences are that although the bracts are united round the stem, the margins are not fused together, but free to their base; the several leaves are relatively broad but very short; the perianth tube is very short, barely emerging from the bracts; and the corms are very small and distinctive in having vertical ridges. It has only been recorded at four localities in the western Cape. The populations on Zebrakop in the Piketberg Mountains (*Esterhuysen 35320*) and near Bains Kloof (*Goldblatt 6840*) grew on S slopes at high elevations. Two other collections, from Steendal, near Tulbagh and above Wabooms River, are evidently from lower mountain slopes. Like many other members of the genus, *H. brevifolia* is night-blooming, flowers opening at about 18h00 and closing shortly after daybreak. The two high altitude collections were in bloom the year after a fire and it is likely that flowering in *H. brevifolia* is fire-induced.

The earliest known collection of this species dates from the Linnaean period, and consists of two plants in the herbarium at Geneva, mounted together with a single specimen of *Hesperantha spicata*, and a fragment of *H. bachmannii*. Label data suggest Roxburgh as the collector of the specimens of *H. brevifolia*, and Forster of *H. spicata*, but the information is confusing. The sheet in question is labelled *Ixia cinnamomea* and "Lin.-Wild" and it also has an annotation by Salisbury, according to a note by N. E. Brown, relating to the specimens of *H. brevifolia*.

SOUTH AFRICA, CAPE—3218 (Clanwilliam): Zebrakop, Piketberg, steep S facing slopes (-DB), *Esterhuysen 35320* (B, BOL, BR, C, E, K, M, MO, NBG, P, PRE, S, US, WAG); Zebrakop, *Linder 82* (BOL).
—3319 (Worcester): "Steindaal", near Tulbagh (-AC), *Zeyher s.n.* (SAM *20819*), Wabooms River, clayish hillside (-AD), *Esterhuysen 22255* (BOL, K); Slopes of the Limietberg, north of Bains Kloof, 3000 ft. (-CA), *Goldblatt 6840* (BOL, K, MO, NBG, PRE, S, US, WAG).

32. **Hesperantha radiata** (Jacq.) Ker, Konig & Sims Ann. bot. **1**: 225. 1805; Baker, Handbk. Irid. 1892 & Flora Cap. **6**: 64. 1896. **Fig. 30.**

Ixia radiata Jacq., Ic. Pl. Rar. **2**: tab. 280. 1782 et Coll. Bot. Suppl. 15.

1796. Type: S. Africa, Cape, without locality, illustration in Jacq., Ic. Pl. Rar. **2:** tab. 280. 1782.

Gladiolus recurvus L. sensu Thunb., Diss. *Gladiolus* no. 3, 1784.

H. radiata var. γ *caricina* Ker, Bot. Mag. sub tab. 573. 1802 et tab. 790. 1805. Type: S. Africa, Cape, without precise locality, illustration in Bot. Mag. tab. 790.

Hesperantha (as *Hesperanthus*) *tenuifolius* Salisb., Trans. Hort. Soc. **1**: 321. 1812 nom. nov. pro *H. radiata* var. *caricina* Ker.

Hesperantha caricina (Ker) Klatt, Abh. nat. Ges. Halle. **15**: 395 (Ergänz. 61) 1882.

Ixia fistulosa Andr., Bot. Rep. tab. 59. 1799, non Ker, 1801. Type: S. Africa, Cape, without locality, illustration in Bot. Rep. tab. 59.

Ixia recurva Vahl, Enumer. Pl. **2**: 58. 1805 nom. illeg. superfl. pro *Ixia fistulosa* Andr.

Hesperantha angustifolia Ker ex Louden, Fl. Gard. Orn. Bulb. Pl. 91. 1841. Type: S. Africa, Cape, without locality, illustration in Bot. Mag. tab. 790.

Hesperantha tysonii Baker, Handbk. Irid. 151. 1892 et Flora Cap. **6**: 65. 1896. Type: S. Africa, Cape, near Kokstad, *Tyson 1585* (K, lectotype here designated; B, GRA, SAM, isotypes).

Hesperantha recurvata Asch. & Graebn., Syn. Mitteleur. Fl. **3**: 540. 1906 nom. nov. pro *Gladiolus recurvus* L. sensu Thunb. Type: S. Africa, Cape, without precise locality, *Thunberg s.n.* (Herb. Thunb. *1059*, UPS, lectotype; *1060*, UPS, syntype).

Hesperantha setacea Ecklon ms., *Ecklon & Zeyher Irid. 400*, Irid. *233* etc., et Top. Verz. 23. 1827 nom. nud.

Plants medium to tall, (100–)200–600 mm high. *Corm* more or less campanulate and symmetrical, flat or oblique at base, 7–14 mm in diameter, occasionally the basal margin extending horizontally as a radiating fringe, or unevenly toothed, tunics brown to black, imbricate, outer layers accumulating over inner and with margins either unbroken or more often notched below, forming regular segments each with a minutely fringed to toothed margin, segments sometimes becoming concave with margins prominent, occasionally bearing 1–3 large cormlets at base. *Cataphyll* solitary, usually

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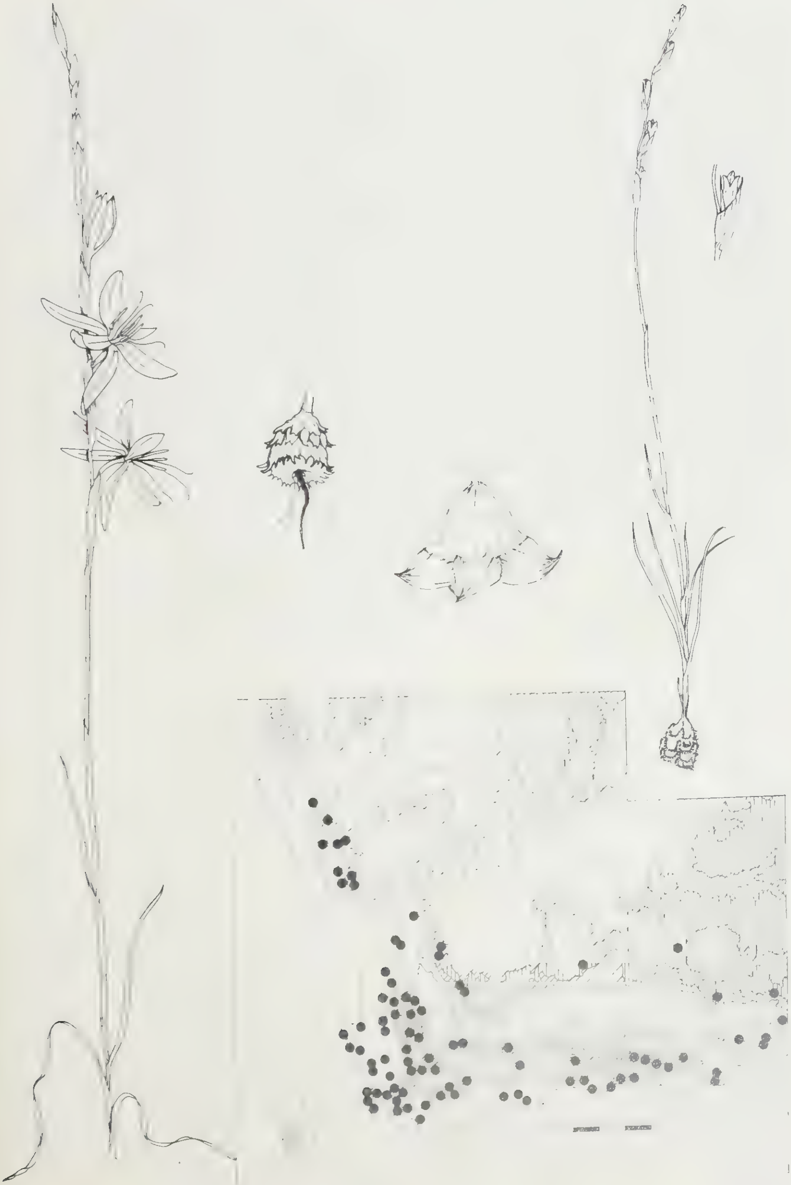
Fig. 30.

Morphology and winter rainfall area distribution of *Hesperantha radiata.* Fruiting plant × 0,5; flowering plant and enlarged capsule life-size; corms × 1,5 (vouchers: flowering spike and left corm *Goldblatt 5138*, Cedarberg, Middelberg; middle corm *Goldblatt 4932*, near Humansdorp; fruiting material *Goldblatt 5179A*, Fernkloof Nature Reserve).



membranous and dry, or apparently lacking. *Leaves* usually 3 or 4, basal or inserted near ground level, the uppermost sheathing the stem for part of its length, linear, erect, usually ca. 2–3 mm wide, short, seldom reaching base of spike, often rather succulent or somewhat inflated when live, rarely falcate and up to 5 mm wide. *Stem* erect, unbranched, with 1–2 large entirely sheathing bract-leaves inserted in mid to upper half. *Spike* (1–)6–15-flowered, straight, secund; *bracts* 12–15(–20) mm long, imbricate in bud, outer sheathing the stem for at least half its length, inner bract equal or slightly longer. *Flower* recurved, and facing downwards, white-cream or greenish, usually with reddish-brown to purple on reverse of outer tepals; *perianth tube* 10–18 mm long, about as long as the bracts or slightly longer, curving towards apex of bracts; *tepals* 7–15(–17) mm long, slightly reflexed when fully open, narrowly ovate-lanceolate, to 5 mm wide, inner narrower than outer. *Filaments* ca. 3 mm long; *anthers* 4–7(–8) mm, usually pendent. Ovary 4–5 mm long, style branches 7–10 mm long. *Capsule* 10–18 mm long, narrow, 3–4 mm wide, upper part only emerging from bracts, and dehiscent in top one third. *Chromosome number 2n* = 26 *(Goldblatt 146; Goldblatt 6283; Goldblatt 5343).*

Flowering time: August–October(–December at high altitudes in the western Cape), October–December in eastern southern Africa.

Distribution: throughout the winter rainfall area, from the Richtersveld to Port Elizabeth; in wet habitats in the arid north west coast, but in a variety of situations elsewhere (also in the eastern Karoo, and Drakensberg to Swaziland, where often treated as *H. tysonii*). Fig. 30.

Hesperantha radiata is one of the most widely distributed species of the genus, and when treated in a wide sense, as here, to include the eastern southern African *H. tysonii*, is unusual in occurring in both winter to summer rainfall areas of southern Africa. It extends from northern Namaqualand through the south western and southern Cape and along the mountain belt of eastern southern Africa to Swaziland. It is most common in the south western Cape, where it occurs on both sand and clay soils, and here exhibits its greatest variability, in height, flower size and corm morphology. In the winter rainfall area it occurs in a variety of habits, while in the drier parts of its range, in Namaqualand, it is usually found at higher altitudes or in wet sites near streams or seeps. In the western Cape it may be found at all elevations from coastal sand flats to clay lower mountain slopes, to sandy upper slopes, and is not limited to moist situations. According to Hilliard & Burtt (pers. comm.), *H. tysonii* (the eastern form) is common in the Drakensberg along watercourses, seeps, bogs and other damp sites.

Throughout its range it is easily recognised by its unusual bracts which are united round the stem for at least half their length. Together with this character are flowers with a curved perianth tube 10–18 mm long which usually slightly exceed the bracts.

Closely related to *Hesperantha radiata* are *H. longicollis*, a longer-tubed species of the Transvaal and Zimbabwe highveld, and the dwarf *H. ballii* of the Chimanimani Mountains of eastern Zimbabwe. In the western Karoo and north west Cape there is another close ally, *H. marlothii*, a low-growing species with spiny corms, which is common on the Nieuwoudtville and Roggeveld escarpments. In *H. marlothii*, which initially seems very like *H. radiata*, the bracts are united for only a short distance around the stem, and the plants are usually smaller and fewer flowered.

Hesperantha radiata exhibits an interesting range of corm morphology (Fig. 30). In the most common western Cape form the margins of the woody corm tunics are minutely fringed, and the lower part is divided into regular segments which become concave, thus elevating the segment margins. In several populations along the Cape west coast, and in the Cedarberg, the tunics tend to be irregularly serrated or even spiny. The peculiar radiate tunic margin of the type form (Jacquin, *Icones Plantarum Rariorum* tab. 280) is uncommon but known in a few collections from the south western Cape (*Barker 8049, Goldblatt 6283*—Malmesbury; *Duthie 619*—Stellenbosch). In summer rainfall areas the characteristic features of the corm are weakly developed or not evident, the tunics are brittle-papery, rather than woody, and the corms usually small. The name *H. tysonii* has been given to the summer rainfall area form of *H. radiata*, but apart from the corm there seem to be no significant differences between this and many of the collections of *H. radiata* from the south western Cape. Plant and flower size are consistently large in summer rainfall area plants, but fall within the range of variation encountered in the south west and western Cape. Differences between plants from summer and winter rainfall areas thus seem negligible, and except for the softness of the corm tunics (encountered in some southern Cape forms, e.g. *Glass 736*—Grahamstown) it is often impossible to tell with certainty whether plants are the eastern or western form. The corm differences are probably related to soil and moisture conditions. I prefer not to consider them of taxonomic significance, at least at specific rank.

An unusual, small-flowered form with a rather congested spike has been given specific recognition as *H. tenuifolius* Salisb. and *H. caricina* (Ker) Klatt, both species based on *Hesperantha radiata* var. *caricina* Ker. This form, which is restricted to the south western Cape, has bracts in the 10–12 mm range, small flowers with tepals 7–9 mm and anthers ca. 4 mm long (e.g. *Garside 1853*—Stellenbosch flats; *H. Bolus s.n.*—Rosebank) and may represent a distinct race but I do not feel that taxonomic recognition is warranted. There is no discontinuity in the range of flower and bract size between this small-flowered form and the largest-flowered plants of the same general area.

A collection made by Zeyher, *Zeyher 3957*, consisting of several plants each with a single flowered spike, has caused some confusion. Both R. C. Foster and G. J. Lewis have considered this an undescribed species. Its corm and general appearance match *H. radiata*. Collections such as *Goldblatt 5179A* and *Goldblatt 5138* consist of a range of plants with from two to ten or more flowers and provide a link between the single-flowered specimens of *Zeyher 3957* and *H. radiata* proper, and suggest that the Zeyher collection merely represents a population of extremely depauperate plants.

Hesperantha angusta (Jacq.) Ker and its homotypic synonyms *Ixia angusta* and *I. linearis* have at times been treated as conspecific with *H. radiata* (e.g. Ker 1827: 90). This species, typified by a figure in Jacquin's *Icones Plantarum Rariorum* tab. 279 (the plate preceding that of the type of *H. radiata*) has a straight perianth tube, flexuose stem, and few-flowered inflorescence, does not appear to belong to section *Radiata* and is most probably a synonym of *H. falcata*.

SOUTH AFRICA, CAPE—2817 (Vioolsdrif): Kliphoogte, Richtersveld (-CD), *Herre s.n.* (BOL).

—2917 (Springbok): Steinkopf, Kasteelport (-BA), *Herre s.n.* (STE *11845*); Top of Spektakel Pass, W of Springbok (-DA), *Goldblatt 5711* (MO, PRE, S, WAG); Hester Malan Reserve, Springbok (-DB), *Le Roux 831* (PRE); 6 miles E of Springbok, *Merxmüller & Giess* (M); Road to Wildeperdehoek, 23 km from Springbok (-DD), *Goldblatt 5751* (MO).

—3017 (Hondeklipbaai): Rietkloof, hills (-BD), *Schlechter 11202* (B, GRA, K, Z).

—3018 (Kamiesberg): Leliefontein (-AC), *Rodin 1470* (BOL, K, MO, PRE, UC); Pedros Kloof–Leliefontein, *Drège 2638* (B, G, K, MO); E slopes of Rooiberg on farm Welkom, *Goldblatt 5768* (M, MO, PRE); DeKom, Karas farm, Kamiesberg (-CA), *Leipoldt 3586* (BOL).

—3019 (Loeriesfontein): Kubiskouw (-CD), *Marloth 12876* (PRE).

—3118 (Van Rhynsdorp): Giftberg (-DC), *Phillips 7511* (BOL, K, SAM, STE); Nardouw Road, Clanwilliam (-DD), *Maguire 1032* (NBG), *Barker 3627* (NBG).

—3119 (Calvinia): Glenlyon, Nieuwoudtville (-AC), *Barker 9383* (NBG); Willemsrivier, *Leipoldt 806* (BOL, SAM); Nieuwoudtville distr., *L. Bolus s.n.* (BOL *21070*, PRE), *Buhr s.n.* (NBG *60200*); 2 miles N of Nieuwoudtville, *Nordenstam 741* (M, NBG, S); Van Rhyns Pass–Nieuwoudtville, *Lewis 2436* (SAM); Foot of the Hantamsberg (-BD), *Lewis 5813* (NBG); Flats near Augustfontein Mts., Calvinia distr. (-CD), *Lewis 5593* (NBG).

—3123 (Victoria West): Near Murraysburg (-DC/-DD), *Tyson 305* (BOL, K, GRA).

—3124 (Middelberg): Gordonville, Sneeuberg (-DA/-DB), *Acocks 16529* (PRE).

—3218 (Clanwilliam): Sand flats near Velddrif (-AC), *Lewis 5988* (MO, NBG); Mamre hills (-AD), *Barker 1808* (NBG), *Compton 11780* (NBG); Groenekloof, *Zeyher s.n.* (SAM); 3 km W of Graafwater (-BA), *Goldblatt 3629* (MO, PRE); Blaauberg (-BD), *Schlechter 8449* (B, BOL, G, GRA, K, L, MO, P, PH, PRE, S, US, Z); Near Alpha, Algeria road, *Gillett 4134* (K); Greys Pass (-DB), *Mauve & Oliver 26* (STE); Zebra Kop, *Esterhuysen s.n.* (MO); Piketberg Mt. (-DC), *Martin*

367 (NBG); Piketberg, *Guthrie 2703* (NBG); DeHoek–Sauer, *Van Niekerk 600* (BOL); Berg River bridge, *Schlechter 5270* (B, Z).

—3219 (Wuppertal): Eikerboom, Cedarberg (-AC), *Leighton s.n.* (SAM *52419*); Middelberg plateau, *Esterhuysen 7232* (BOL), *7276* (BOL, PRE); Between Ezelsbank and Dwarsrivier, 3–4000 feet, *Drège s.n.* (S); Middelberg, vlakte, *Goldblatt 5138* (MO); Grootlands plateau, *Jackson s.n.* (NBG *60205*); Citadel Kop, Cedarberg, *Compton 24285* (NBG); Elandskloof (-CA), *Lewis s.n.* (BOL); Kromme R., Cedarberg, *Acocks 2216* (S); Shale hill S of Citrusdal, *Goldblatt 6266* (MO); Schoongesig, Cold Bokkeveld (-CC), *Hanekom 1271* (K, PRE); Bokkeveld Tafelberg (-CD), *Esterhuysen 3912* (BOL); North end of Cold Bokkeveld, *Goldblatt 5343* (MO, PRE); Bokkeveld River farms, campsite, *Middlemost 2248* (NBG).

—3220 (Sutherland): Fransplaas, Sutherland distr. (-B), *Marloth 9832* (B, PRE); 40 miles NW of Sutherland (-AD), *Hall 3295* (NBG); Voëlfontein, NW of Sutherland, valley S of farm house, *Goldblatt 6315* (MO, NBG, S).

—3225 (Somerset East): Somerset East (-DA), *Bowker s.n.* (K).

—3226 (Fort Beaufort): Katberg, (-BC), *Galpin 1724* (B, K, GRA, PRE); Above Foresters Cottage, Katberg, *Dyer 1791* (GRA), *Hutchinson 1679* (K); Alice (-DD), *Bokelman s.n.* (NBG *60065*).

—3317 (Saldanha): Hoetjies Bay, dunes (-BB), *H. Bolus s.n.* (BOL *12840*).

—3318 (Cape Town): Geelbek, Malmesbury Div. (-AA), *Barker 4616* (NBG); Langebaan Peninsula, *Boucher 2782* (STE); Near Hopefield (-AB), *Bachmann 2171* (B); Platteklip, Darling (-AD), *Liebenberg 8271* (PRE); Moorreesburg (-BA), *Bachmann 1175* (B, Z); Hills around Malmesbury (-BC), *Schlechter 1659* (B, GRA, L, PRE, Z); Malmesbury commonage, burnt ground, *Barker 8049* (NBG), *Lewis 3639* (SAM); Riverlands, *Esterhuysen s.n.* (MO); Table Mt., Diamond Spring Path (-CD), *Esterhuysen s.n.* (SAM *54323*); Table Mt., *Ecklon 400* (K, MO, S, PRE, Z), *Schinz s.n.* (Z), *Zeyher s.n.* (SAM *20813*); Table Mt. between Skeleton and Window Gorges, *Esterhuysen 11221* (BOL, PRE); Table Mt. near summit, *Wolley Dod 2118* (K); Rosebank, Cape Town, *H. Bolus s.n.* (BOL *3769*, K, PRE, Z); Signal Hill, *Wolley Dod 3456* (K), *Wilms 3706* (B, K), *Marloth 1591* (PRE); Camps Bay, *Prior s.n.* (K, PRE, Z), *Cassidy s.n.* (NBG); Lions Mt., *Schlechter 1371* (B, G, Z); Tygerberg Nature Reserve (-DC), *Loubser 3028* (MO); Langverwacht, Kuils River, *Oliver 4756* (K, PRE, STE), *4332* (K, STE); Stellenbosch (-DD), *Sanderson s.n.* (K), *Duthie 619* (BOL); Stellenbosch flats, *Garside 1653* (B, K), *Holzapfel 10* (STE); Flats N of Hercules Pillar, *Acocks 4707* (S); Lower slopes of Bottelary hills, near Faure, *Stokoe s.n.* (SAM); Flats N of Bottelary road, *Acocks 1913* (S).

—3319 (Worcester): Visgat (-AA), *Stokoe s.n.* (SAM *63134*); Sneeugat, Groot Winterhoek Mts., *Phillips 1873* (SAM); Op-de-Berg, Cold Bokkeveld, *Thompson 1558* (STE); Tulbagh Road station (-AC), *Guthrie 3014* (NBG); Tulbagh, *Burchell 1037* (K); Michells Pass (-AD), *Barker 4896* (NBG); Flats N of Prince Alfred Hamlet, *Oliver 5048* (STE); Near Wolseley, *Diels 1004* (B); Keeromsberg, shale band (-BA), *Esterhuysen 9276* (BOL); Waaihoek (-BB), *Esterhuysen 8296* (BOL); Sentinel Camp, Hex River Mts. (-CA), *Esterhuysen 8439* (BOL); Darling Bridge, *Walgate 400* (NBG); Worcester Veld Reserve (-CB), *Olivier 122* (STE); Foot of Naudesberg, Koo (-DA), *Lewis 5705* (MO, NBG, PRE, S, STE); Sand Hills, Worcester district, *Walters 4* (NBG).

—3320 (Montagu): Tweedside (-AB), *Marloth 10826* (PRE); Touws River, flats N of town (-AC), *Goldblatt 70* (J), *146* (J); Bonnievale hills (-CC), *Marloth 11822* (PRE, STE), *11823* (PRE).

—3321 (Ladismith): Towerkop kloof, Ladismith (-A), *Wurts 1155* (NBG); Rooiberg, kloof W of Teeboskop (-DA), *Oliver 5338* (STE).

—3322 (Oudtshoorn): Near George (-CD), *Burchell 6086* (K); Doornkraal farm, De

Rust (-DA), *Dahlstrand 2160* (STE), *2113* (J); Groot Umtini (Homtini) (-DD), *Schlechter 5904* (B, BOL, GRA, L, PRE, Z).
—3323 (Willowmore): 2 miles east of Keurbooms River (-CD), *Gillett 1402* (BOL); Blaauwbosch Pass (-DC), *Fourcade 2817* (BOL, K, MO, PRE, STE).
—3324 (Steytlerville): Baviaans Kloof (-CA), *Bayliss 7705* (MO, NBG); Bokkraal, 51,5 miles from Humansdorp, on road to Willowmore, *Fourcade 5161* (BOL, STE); Poort between Patensie and Cambria (-DA), *Thompson 1892* (STE); Cockscomb, Great Winterhoek Mts. (-DB), *Esterhuysen 27504* (NBG, PRE); 5,5 km north of Hankey (-DD), *Goldblatt 4932* (MO).
—3325 (Port Elizabeth): Bethelsdorp (-CD), *Long 1356* (K, PRE); Redhouse (-DC), *H. Bolus s.n.* (BOL *195* in GRA), *Paterson 47* (BOL); Along Swartkops R. and Addo, *Ecklon 232* (MO, S, SAM); Perseverance, sand near river, *Bayliss 4837* (MO).
—3326 (Grahamstown): Riebeeck East, Albany district (-AA), *Bayliss 5937* (MO, Z); Howisons Poort (-AD), *Glass 736* (NBG, SAM); Near Tunnel, Grahamstown, *Daly & Cherry s.n.* (GRA, J, PRE *25864*); Grass slopes round Grahamstown (-BC), *Galpin 283* (GRA, K, PRE); Grahamstown, *MacOwan s.n.* (K).
—3418 (Simonstown): Grootkop, C. Peninsula (-AB), *Compton 19417* (NBG); Lower slopes of Klaasjagersberg, *Goldblatt 5269* (MO); Krom R., C. Peninsula, *Barker 3879* (NBG); Simons Bay, *Wright s.n.* (GH, K); Sir Lowry's Pass (-BB), *Schlechter 1130* (B, BOL, Z); Hottentots Holland, *Zeyher s.n.* (SAM *20810*); Palmiet River mouth (-BD), *Barker 1480* (NBG); Porter Reserve, Betty's Bay, *Tijmens s.n.* (NBG *52899*).
—3419 (Caledon): Victoria Peak (-AA), *Esterhuysen 9764* (BOL); Foot of Houw Hoek Pass, *Goldblatt 3685* (MO), *5638* (MO); Caledon Zwartberg and Baths (-AB), *Ecklon & Zeyher Irid. 237* (G, MO); Highlands (-AC), *Compton 12252* (NBG); Fernkloof Nature Reserve, Hermanus, *Goldblatt 5179A* (MO), *Robertson 393* (MO); Die Mond, Voëlklip, Hermanus (-AD), *S. Williams 333* (MO); Riviersonderend Mts. (-BB), *Stokoe s.n.* (SAM *57328*).
—3420 (Bredasdorp): Between the Riviersonderend and Breede Rivers (-AA), *Ecklon & Zeyher s.n.* (P); am Riviersondereinde bei Stormvalei, Hessaquaskloof bis Breederivier, *Ecklon & Zeyher Irid. 233* (89.9) (B, C, G, GH, LD, MO, UPS, US).
—3421 (Riversdale): Riversdale (-AB), *Rust 626* (B), *5* (B); Albertinia commonage (-BA), *Muir 969* (BOL); Road to Gouritz R. mouth (-BD), *Lewis 5593* (NBG).
—3423 (Knysna): Knysna (-AA), *Newdegate s.n.* (B); Hills above Witte Drift, Knysna (-AB), *Fourcade 1503* (BOL); Plettenberg Bay, *Smart s.n.* sub *Rogers 27958* (Z).

Without precise locality: Silverrivier, *Penther s.n.* (Z); Blesbokvlakte 3–4000 feet, *Drège s.n.* (S); *Thunberg s.n.* (S, UPS); *Sparrman s.n.* (S, UPS); *Rogers s.n.* (K); *Harvey s.n.* (K): *Siebold s.n.* (B); *Link s.n.* (B); *Bergius s.n.* (B); *Mund & Maire 502* (B); *Ecklon & Zeyher s.n.* (B); *Zeyher 3907* (B, SAM), *3756* (P); *Verreaux s.n.* (G); *Roxburgh s.n.* (G); *Lalande s.n.* (P); In montibus pr. Broekhuizens Poort, *MacOwan 1138* (S); Kareebergen, *Burchell 1548* (K).

(Material seen from outside the map area (Fig. 30) is not cited.)

33. **Hesperantha marlothii** Foster, Contr. Gray Herb. **166**: 20. 1948. Type: S. Africa, Sutherland distr., towards Waterkloof, *Marloth 10412* (B, holotype; PRE, STE, isotypes). **Fig. 31.**

Plants (40–)60–200(–250) mm high. *Corm* symmetric, triangular in outline, flat based, 8–13 mm in diameter at widest, with spiny projections extending from the base, tunics dark, usually with several layers present, outer decreasing in size. *Cataphyll* solitary, membranous. *Leaves* 3(–4), basal, uppermost often sheathing stem for some distance, linear, longest about as long as stem, (1–)1,5–3 mm wide. *Stem* erect, simple, usually bearing a leaf-like bract inserted in lower half. *Spike* (1–)2–5-flowered; *bracts* herbaceous, often flushed with red, 10–20 mm, subequal or inner shorter, outer sheathing stem only at base or for 2–4 mm, but no more than one-third its length. *Flower* facing downwards, sweet-scented, opening at sunset, cream, outer tepals red-brown on reverse; *perianth tube* 10–12 mm long, curving at or near apex of bracts, usually shortly exserted; *tepals* 10–15 mm long, slightly reflexed when fully open, narrowly ovoid, 4–5 mm wide. *Filaments* 4–6 mm long; *anthers* 4–6 mm, pendent. Ovary 2–4 mm long, style branches 7–10 mm. *Capsule* ovoid-oblong, 6–8 mm long and 4 mm wide, initially enclosed by bracts. *Chromosome number* $2n = 26$. (*Goldblatt 5813, 5835A*).

Flowering time: late July–September.

Distribution: Roggeveld escarpment west of Sutherland and Middelpos, the Bokkeveld escarpment between Nieuwoudtville and Lokenburg, and local in the northern Cold Bokkeveld and the high country east of Matroosberg; typically in shallow soil overlying rock, usually waterlogged in winter and spring. Fig. 31.

Hesperantha marlothii is morphologically very similar to *H. radiata* and the two species have nearly identical flowers. *Hesperantha marlothii* differs in its depressed corm with a broad flat base from which long spines are produced; a rather few-flowered inflorescence; and bracts which are united only at their base (or for only a short distance) around the stem. The species was, until recently, poorly known but it has now been collected at several localities over a wide geographical range. It grows in seasonally moist situations, either in seeps, marshes, or stream banks, and often in shallow soil overlying rock. *Hesperantha radiata* occurs in the same general area as *H. marlothii*, usually on deeper soils and drier situations. It is clear that *H. marlothii* is not merely an ecological variant of the more widespread *H. radiata*, but the two species are obviously closely related.

Hesperantha marlothii is rather variable in size and number of flowers per spike. Robust plants are more common in the Roggeveld, in the south of its range, where soils are generally richer than along the Bokkeveld escarpment where the substrate is a nutrient poor, coarse quartzitic sand. Some populations from the Bokkeveld escarpment, e.g. *Goldblatt 5835A* from near Nieuwoudtville, growing on very thin soil, are single-flowered and so stunted as to appear at first specifically distinct. Plants from deeper soils in the area, e.g. *Goldblatt 3960* and *Lewis 5842* are larger, and 2–[illegible] flowered, while some populations here collected in favourable growing seasons comprise a range of plants (*Goldblatt 6219*), the largest of which are 3–4-flowered and as robust as, and indistinguishable from, plants collected in the Roggeveld. Given the degree of variability in populations throughout the range of the species, it does not seem worthwhile recognising the smaller northern form as taxonomically distinct.

SOUTH AFRICA, CAPE—3119 (Calvinia): Depressions in rocky pavement W of Nieuwoudtville (-AC), *Goldblatt 5835A* (MO); 3 miles W of Nieuwoudtville, *Lewis 1985* (BOL, SAM); Meulsteenvlei, near edge of escarpment, *Lewis 5869* (NBG); Near Grasberg, *Lewis 5842* (NBG); 8 km NW of Nieuwoudtville, on Grasberg road, *Goldblatt 3960* (K, MO, PRE, S); Oorlogskloof hills, *Schlechter 10946* (B, BOL, GRA, PRE); Lokenburg, arid fynbos (-CA), *Acocks 16864* (PRE); Roggeveld Mts, Vondelingsfontein, E of escarpment (-DD), *Thompson 2485* (PRE, STE).

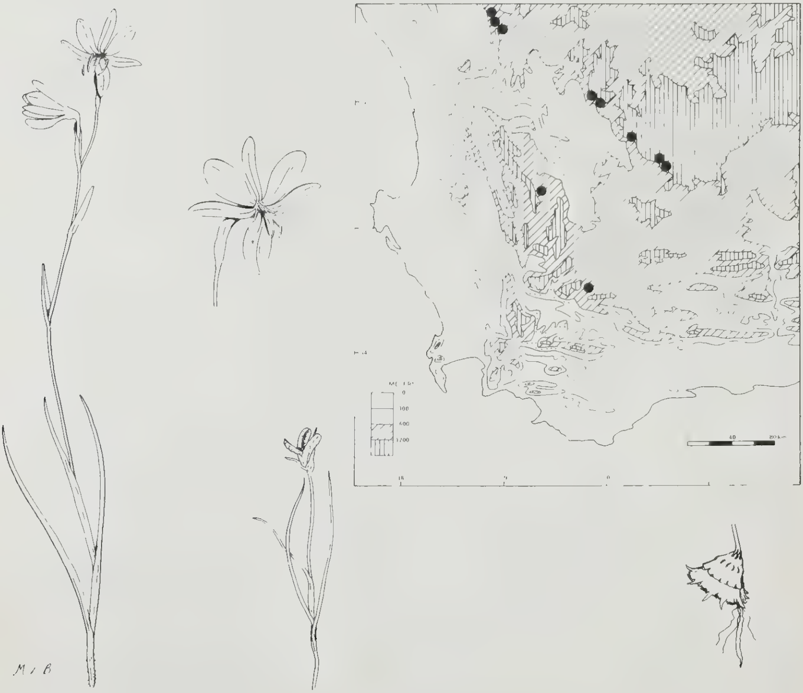


FIG. 31.
Morphology and distribution of *Hesperantha marlothii*. Habits × 0,5; flower and corm life-size (vouchers: flowering material *Goldblatt 6314*, Voëlfontein, Roggeveld; fruiting material *Goldblatt 5835A*, Nieuwoudtville).

—3120 (Williston): Blomfontein farm, W of Middelpos (-CC), *Barker 10773* (NBG); 66 km S of Calvinia on Blomfontein road, *Goldblatt 5813* (K, MO).
—3219 (Wuppertal): Cold Bokkeveld, 14,3 miles N of Excelsior farm (-CD), *Taylor 5922* (STE).
—3220 (Sutherland): Quaggasfontein farm, on road to Agterplaas, Roggeveld, 4700 ft (-AB), *Goldblatt 6351* (K, MO); Voëlfontein farm, Sutherland district (-AD), *Hall 3275* (NBG, S), *Hall s.n.* (NBG *87499*); Voëlfontein, valley S of farm house, common in wet places, *Goldblatt 6314* (K, MO, NBG, PRE, S, US); Klipfontein, SW of Sutherland, *Thompson 1788* (K, PRE, STE), *Oliver 4397* (STE); Stony place, towards Waterkloof (-BC), *Marloth 10412* (B, PRE, STE); Geelhoek, 10 miles WSW of Sutherland, *Acocks 16993* (STE).
—3319 (Worcester): Between Rooihoogte Pass and Matroosberg Station, near FM tower (-DB), *Mauve & Oliver 191* (STE).

34. **Hesperantha muirii** (L. Bolus) Lewis, Jl S. Afr. Bot. **7**: 32. 1941. **Fig. 32.**

Acidanthera muirii L. Bolus, Ann. Bolus Herb. **1**: 195. 1915. Type: S. Africa, Cape, Tygersfontein–Skilpadgat, Riversdale distr., *Muir 1087* (BOL, holotype).

Hesperantha muirii var. *robusta* Lewis, Jl S. Afr. Bot. **7**: 33. 1941. Types: S. Africa, Cape, Plattekop farm, Riversdale, *Ferguson s.n.* (BOL *19966*, lectotype here designated; K, isolectotype); Near Riversdale, *Schlechter 1819* (PRE, syntype; GH, GRA, K, P, isosyntype).

Plants 100–200 mm high. *Corm* ± campanulate, 6–8 mm in diameter, base flat, or oblique, tunics brown, of several overlapping layers, divided below into regular segments each with a minutely fringed margin. *Cataphyll* solitary, membranous, brown. *Leaves* 2–4, basal, uppermost sheathing the stem for some distance, linear, erect, 30–80 mm long, 1,5–2 mm wide. *Stem* erect, simple, bearing (1–)2 sheathing bract-like leaves, lower with a free apex, and leafy, upper sometimes reaching to base of spike. *Spike* 1–3-flowered; *bracts* herbaceous, often red-flushed, 18–30(–40) mm long; outer with margins united at base round stem or inner bract, for 2–3 mm, inner equal to or smaller than outer. *Flower* secund, pale pink to ivory, zygomorphic with unilateral, ultimately dependent anthers; *perianth tube* 15–25 mm long, curved towards apex; *tepals* 15–25 mm long, 6–9 mm wide, narrowly ovoid-elliptic. *Filaments* 8–10 mm; *anthers* 6–10 mm long, evidently unilateral. Ovary ca. 5 mm long, style branches to 15 mm, exceeding anthers, loosely twisted and pendent. *Capsule* 15–20 mm long, narrow, enclosed in bracts. *Chromosome number* $2n = 26$ (*Goldblatt 5189*).

Flowering time: October–November.

Distribution: clay slopes and flats between Albertinia and the Bredasdorp district, especially common around Riversdale. Fig 32.

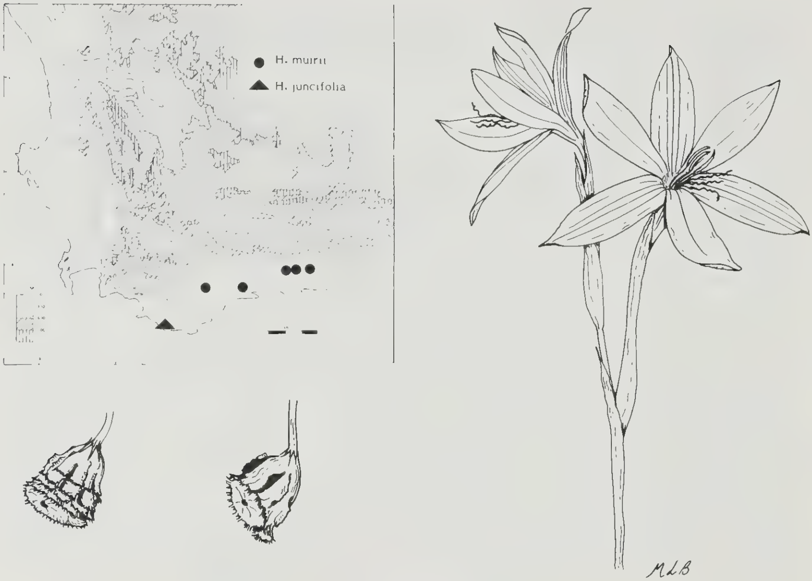


FIG. 32.
Morphology of *Hesperantha muirii* and distribution of *H. muirii* and *H. juncifolia.* Flowering spike and corms life-size (voucher *Goldblatt 5189*, Riversdale).

Hesperantha muirii is placed here in section *Radiata*, which contains most of the species of the genus with a curved perianth tube. It is one of the more distinctive species of the alliance, standing well apart from *H. radiata* and its relatives. It is striking in its large pale pink to ivory flower, long bracts and very small corms which resemble in form those found in *H. radiata.* A larger, several-flowered form, named var. *robusta* by Lewis (1941) does not in my opinion warrant taxonomic recognition. Variation in some populations is considerable near Riversdale (e.g. *Goldblatt 5189*), and may include a range of plants from dwarf, 1–2-flowered individuals in dry exposed situations, to taller, 2–3-flowered individuals, matching var. *robusta*, in more favoured places. This large-flowered species would appear to be a desirable horticultural subject.

SOUTH AFRICA, CAPE—3420 (Bredasdorp): Vrede, 40 km N of Bredasdorp on Swellendam road (-AC), *Thompson 3271* (K, PRE); W base of Potberg (-BC), *Pillans 9355* (BOL, NBG, PRE).
—3421 (Riversdale): Plattekop farm 3–4 miles from Riversdale (-AB), *Ferguson s.n.* (BOL *19966*, K); Riversdale, *Schlechter 1819* (GH, GRA, K, P, PRE); 5 km W of

Riversdale, *Goldblatt 5189* (B, BOL, C, E, K, M, MO, NBG, P, PRE, US, WAG), *Goldblatt 5437* (MO); Tygersfontein, beyond Schuldpadgat (-BA), *Muir 1087* (BOL); Summit of hills beyond Skilpaddrift, near Albertinia, *Muir 1836* (J, K).

Without precise locality: Riversdale Division, *Cape Town Wild Flower Show s.n.* (BOL *22554*).

35. **Hesperantha juncifolia** Goldbl., sp. nov.

Plantae 180–200 mm altae, *cormo* ad 15 mm in diametro, ± campanulato, tunicis imbricatis, foliis 4, inferioribus duobus basalibus, imbricatis, teretibus, ca. 1,5 mm in diametro, *spicis* ca. 8 floribus, *bracteis* (10–)12–14 mm longis, marginibus connatis infra, *floribus* hypocrateriformibus, albis, rubris dorso tepalis exterioribus, *tubo perianthii* 5–6 mm longo, *tepalis* 13–15 mm longis, *filamentis* brevibus, ad 2 mm longis, *antheris* ca. 6 mm longis.

Type: S. Africa, Cape, Bredasdorp distr., Ratel River, limestone flats, *Goldblatt 403* (BOL, holotype).

Plants 180–200 mm high. *Corm* large, to 15 mm in diameter, more or less campanulate with an oblique flat base, tunics imbricate, with older layers accumulating above, scalloped below into segments, each somewhat concave with raised edges. *Cataphyll* single, dry, membranous. *Leaves* terete, narrow, ca. 1,5 mm in diameter, usually 4, lower 2 basal, upper inserted in stem, leaf sheaths overlapping one another, uppermost leaf sheathing stem to shortly below spike, with free distal part about as long as spike. *Stem* erect, simple, sheathed by leaf bases. *Spike* ca. 8-flowered, *bracts* (10–)12–14 mm long, green below, membranous above, margins of outer bract united in lower half to third, round stem, inner bract slightly shorter than outer. *Flower* secund, hypocrateriform, white, with red on reverse of outer tepals, subzygomorphic with anthers held towards upper tepal and style branches against lower tepals; *perianth tube* straight, 5–6 mm long, shorter than bracts; *tepals* obovate, acute, 13–15 mm long, outer to 6 mm wide, inner to 5 mm. *Filaments* to 2 mm long; *anthers* ca. 6 mm long. Ovary spindle-shaped, 4–5 mm long, style branches ca. 9 mm long, unilateral. *Capsule* unknown, *Chromosome number* unknown.

Flowering time: late September–October.

Distribution: from the single collection known, an endemic of limestone flats along the Cape Agulhas coast. Fig. 32.

The peculiar corm tunics with their scalloped concave segments and bracts united round the stem place *Hesperantha juncifolia* quite clearly in section *Radiata*. It is probably most closely allied to *H. radiata* from which it differs in its long and terete, junciform leaves, and relatively short, straight perianth tube. The corm tunics are very like those found in some populations of *H. radiata*. *Hesperantha juncifolia*, apparently an endemic of the Agulhas coast, is probably confined to the limestone belt of this area. Further collections are needed to establish how rare the species is, but it is almost certainly endangered, given the massive encroachment of the southern Cape limestone flora by the aggressive alien tree *Acacia cyclops*, which chokes out the native vegetation as it spreads.

SOUTH AFRICA, CAPE—3419 (Caledon): Ratel River, limestone flats near Quoin Point (-DC), *Goldblatt 403* (BOL).

36. **Hesperantha elsiae** Goldbl., sp. nov. **Fig. 33.**

Plantae 250–300 mm altae, *cormo* 10–12 mm in diametro, ± globoso, tunicis imbricatis, *foliis* 3–4, inferioribus duobus basalibus, ca. 1 mm latis, *spicis* 1–4 floribus, *bracteis* ca. 15 mm longis, submembranaceis, floribus carneis, *tubo perianthii* 13–21 mm longo, supra expanso, staminibus inclusis, *tepalis* 13–15 mm longis, *filamentis* brevibus, ca. 1,5 mm longis in medio tubo insertis, *antheris* ca. 5,5 mm longis, inclusis, stylo breve, apicibus ramorum ex tubo emergentibus.

Type: S. Africa, Cape, Cedarberg, Krom Rivier Kloof at Disa pool. *Goldblatt 5331* (MO, holotype; K, NBG, PRE, S, US, WAG, isotypes).

Plants 250–300 mm high. *Corm* ± globose, 10–12 mm in diameter, asymmetric with an oblique flat base; tunics imbricate, brown, of several overlapping layers, the outer smaller, lower margins regularly V-notched into segments, old leaf bases and stems sometimes accumulating in a neck above the corm. *Cataphyll* solitary, membranous, pale to dark brown. *Leaves* 3–4, lower 2 basal and often dry by flowering time, linear, soft and drooping, about half as long as stem, ca. 1 mm wide, upper leaves cauline and partly sheathing. *Stem* erect, bearing 2–3 leaves, the lower longest and inserted near base, and sheathing for over half its length, upper entirely sheathing. *Spike* 1–4-flowered, flexuose; *bracts* submembranous, drying in upper half and red-flushed, ca. 15 mm long, inner usually slightly longer than outer, margins of outer united around stem at base. *Flower* secund, deep pink, tube slightly curved and tepals spreading; *perianth tube* 13–21 mm long, narrow in lower part, expanded above to include anthers, well exserted from bracts; *tepals* outspread 13–15 mm long, 5–7 mm wide, inner slightly smaller than outer. *Filaments* ca. 1,5 mm long, inserted in middle of perianth tube; *anthers* ca. 5,5 mm long, entirely included in perianth tube.

Ovary ca. 4 mm long, style dividing at base of anthers, branches ca. 8 mm long, apices emerging from perianth tube. *Capsule* ovoid, ca. 9 mm long. *Chromosome number* 2n = 26 (*Goldblatt 5331*).

Flowering time: December.

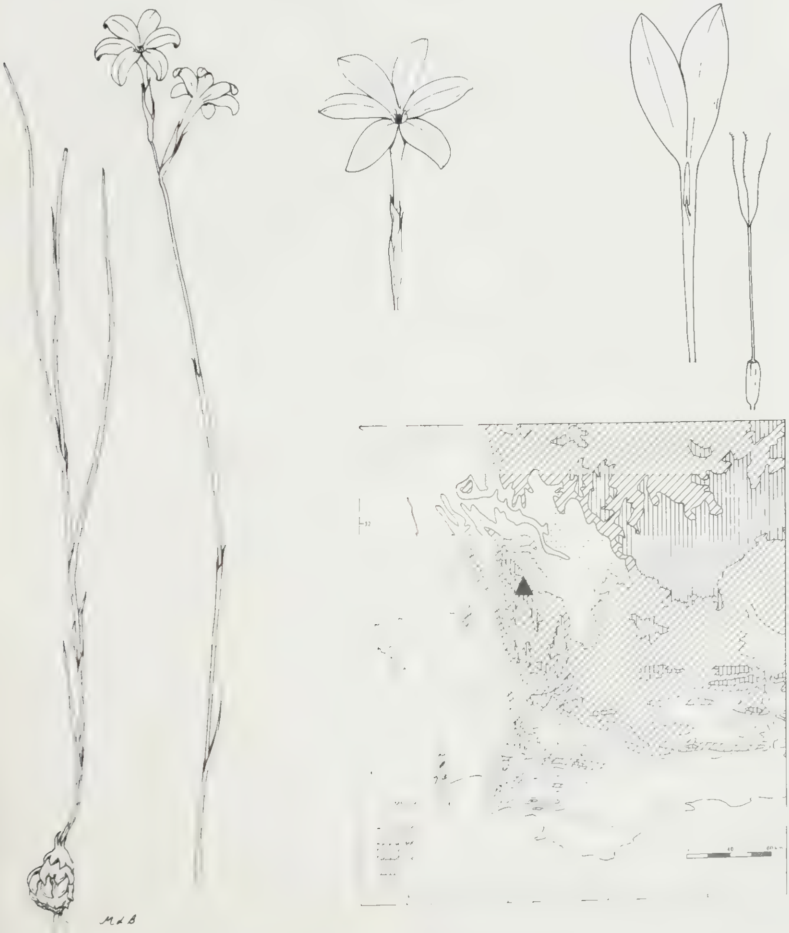


FIG. 33.

Morphology and distribution of *Hesperantha elsiae*. Habit × 0,5; flower life-size; partial flower and gynoecium × 1,5 (voucher *Goldblatt 5331*, Cedarberg above Krom River).

Distribution: southern Cedarberg, damp places at middle altitudes, ca. 1 200 m (ca. 4000 feet) on S-facing slopes. Fig. 33.

This very distinctive species was evidently first collected in 1950 by Elsie Esterhuysen, the well-known Cape botanist, and the species is named in her honour. There are apparently only two other collections, *Pattison s.n.* (BOL), said to have come from Hopefied, and the type collection, *Goldblatt 5331*, gathered in Krom Rivier Kloof where Esterhuysen first discovered it. *Hesperantha elsiae* is so distinct that there can be no question about the identity of the Pattison collection, but the locality is almost certainly incorrect, and the whole label may be misplaced.

Hesperantha elsiae is very striking in its general appearance, with narrow leaves, a long slender stem, and large pink flowers. The floral characters are even more unusual. The stamens are entirely included in the perianth tube, an unusual character in *Hesperantha*, shared only with the unrelated *H. cedarmontana*. The style divides within the tube, producing three long branches which extend between the anthers to emerge a short distance from the mouth of the tube. There seems no reason to doubt the generic position of the species even though the stamens and style are so unusual. The style, as in other species, does divide below the anthers, and the style branches are as long as in many other species, although largely included in the perianth tube.

Two other species of the genus have similar short filaments and included to partly included anthers and styles. These are *Hesperantha saldanhae* and *H. cedarmontana*, both of which belong to section *Hesperantha*, and have flat-sided corms. The former has exserted anthers on short 1 mm long filaments and is almost certainly related to *H. spicata*. *Hesperantha cedarmontana* has a style which divides within the tube, and the style branches may be entirely included or reach the apex of the tube, and is very different. Despite the shared similarities with these species, *H. elsiae* is most probably related to the widespread *H. radiata*, with which it is similar in general leaf and corm features, but differences are such that it stands in a fairly isolated position in section *Radiata*. It is clear that the unusual style and stamen characteristics were acquired independently in *H. elsiae*, *H. cedarmontana*, and *H. saldanhae*. The floral specialisation is presumably related to its insect pollinators, but nothing is yet known about pollination in this and most other species of *Hesperantha*.

SOUTH AFRICA, CAPE—3219 (Wuppertal): Krom River Kloof, ca. 4000 feet, *Esterhuysen 17966* (BOL, K, UPS), *Goldblatt 5331* (K, MO, NBG, PRE, S, US, WAG).

Doubtful locality: Hopefield, *Pattison s.n.* (BOL).

EXCLUDED SPECIES OF THE WINTER RAINFALL AREA

Hesperantha ciliata E. Meyer ex Klatt, Abh. nat. Ges. Halle **15**: 394 (Ergänz. 60) 1882, nom superf. pro *Geissorhiza rosea* Eckl. (Intended as a new species with *G. rosea* perhaps regarded as a nomen nudum). Type: South Africa, Cape, Hexrivierskloof, *Drège 525* (B ex Herb. LU, holotype) = *Geissorhiza heterostyla* L. Bolus (syn. *G. rogersii* N.E.Br.)

Hesperantha crispa Eckl., Top. Verz. 22. 1827, nomen nudum. Identity unknown.

Hesperantha kermesina Klatt, Abh. nat. Ges. Halle **15**: 395 (Ergänz. 61) 1882. Type: South Africa, Cape, without precise locality, *Drège 8480* (B ex Herb. LU, holotype) = *Geissorhiza inflexa* (de la Roche) Ker.

Hesperantha latifolia Spreng. ex Steudel, Nomencl. ed. 2, **1**: 753. 1840. "Herb. Ecklon", nomen nudum. Identity not known.

Hesperantha pentandra Drège ms., (in synon. Baker, J. Linn. Soc. **16**: 163. 1878) = *Ixia scillaris* L. (Baker, 1896; Lewis, 1962).

Hesperantha quinquangularis Eckl., Top. Verz. **23**: 1827, nomen nudum [see also Klatt, Abh. nat. Ges. Halle **15**: 395 (Ergänz. 61) 1882] = *Geissorhiza inflexa* (de la Roche) Ker.

Hesperantha quinquangularis (Eckl. ex Klatt) Klatt, Durand & Schinz, Consp. Fl. Afr. **5**: 176. 1895, basionym *Geissorhiza quinquangularis* Eckl. ex Klatt, Linnaea **34**: 654. 1866. Types: South Africa, Cape, Caledon Zwartberg, *Ecklon & Zeyher Irid. 214* [B, lectotype effectively designated by Foster (1941: 54)] = *Geissorhiza inflexa* (de la Roche) Ker (see Goldblatt & Barnard, 1970).

Hesperantha rosea Klatt, Abh. nat. Ges. Halle **15**: 395. (Ergänz. 61) 1882. Type: South Africa, Cape, Knysna, *Newdegate s.n.* (B ex Herb. LU, holotype) = *Geissorhiza heterostyla* L. Bol. (syn. *G. rogersii* N.E. Br.)

Hesperantha subulata Baker, Bull. Herb. Boiss. ser. 2, **1**: 864. 1901. Type: South Africa, Cape, Cape flats, *Rehmann 1850* (Z, lectotype; BM, isolectotype) = *Geissorhiza juncea* (Link) A. Dietr.

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